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T. PASCOE,  
*Minister of Agriculture.*

## POINTS FOR PRODUCERS.

**Machinery in Agriculture.**

The authorities in Great Britain are taking very active steps to keep in the forefront of the applications of machinery in agriculture. The Minister of Agriculture is setting up a permanent committee to make thorough practical tests of all the appliances which are now on the market or which may be introduced from time to time. Farmers and manufacturers will both be consulted in the arrangements for the tests, which will be carried out at trial stations, and will take into account all the elements of cost, reliability, and so on, usually neglected in competitive trials. No fees will be charged, and the results of the tests will be made public. Every encouragement will therefore be given to the introduction of improved types of machinery. The Board of Agriculture has also developed a number of research institutes, in which prolonged study is made of seeds, manures, processes of cultivation, and the breeding and diseases of animals. Over £100,000 a year is now being spent on this work.

**Drake.**

The Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. Agric., M.R.C.V.S.), has supplied the following information at the request of a correspondent:—Darnel, or drake, is definitely known to be poisonous under some circumstances. The plant itself is non-toxic, but the seeds are subject to invasion by a fungus (*Endoconidium temulentum*), the hyphal threads of which contain a narcotic alkaloid termed temuline. The fungus is by no means always present, but as much as 0.6 per cent. of temuline has been found in the seeds. It is believed that darnel grains are more toxic in wet seasons, but there are no experimental data concerning the degree of toxicity in different samples, and mean figures, even for Great Britain or United States of America, are not available. The effects of the poison are apparently cumulative, as animals at pasture rarely suffer unless they have been grazing on drake-infested fields for a prolonged period. Cornevin conducted trials with a view to testing the degree of tolerance in farm animals, and obtained the following results:—

*Amount of Drake Necessary to Cause Death.*

Horse . . . . .	0.7lb. per 100lbs. live weight
Ruminants and poultry . . . . .	1.5lbs. to 1.8lbs. per 100lbs. live weight
Dog . . . . .	1.8lbs. per 100lbs. live weight

He found pigs to be but little affected, but instances of darnel poisoning in pigs are not infrequent. Personally, I do not think a sample containing 75 per cent. of drake a safe food for any class of stock. The risks involved are considerable, and the amount of grain involved is too small to warrant one in advocating dilution with sound grain as a way out of the difficulty.

### Pear Scab and Mottle Leaf.

The accepted remedy for pear scab, or black spot fungus (*fusicladium pyrinum*) is Bordeaux mixture, applied first just when the blossoms are expanding in the spring season, and repeated again a little later, after the fruits are fully formed, when 1lb. of lead arsenate may be mixed with each 50lbs. of the Bordeaux to suppress codlin moth also, at the one operation, says the Horticultural Instructor (Mr. George Quinn). Some growers living in wet districts have sprayed their pear trees with pure bluestone, 1lb. dissolved in 10galls. of water, in the late autumn, as the foliage is falling freely from the trees, and claim better results than from the spring sprayings only. The trouble affecting apple tree leaves, popularly called "mottle leaf," appears to be due to some form of disturbance taking place in the functional characters of the leaves, whereby the formation of the green coloring matter in the chloroplastids is inhibited. The cause has not yet been clearly defined, but some growers claim to have eliminated it from trees by the application of iron sulphate to the soil. Crushed crystals of the iron sulphate should be sown at the rate of about a couple of pounds over the ground beneath the tree on the area occupied by the root system, and forking it into the soil. This treatment should be applied twice in a year, first in late autumn, and again just after mid-winter.

### Bearing Heifer Calves.

At the Turretfield Experimental Farm we have continued the policy of purchasing and rearing heifer calves from good dams and by desirable sires, the property of metropolitan dairymen, says the Director of Agriculture (Professor Arthur J. Perkins) in his Annual Report for the year 1919-1920. The object of this arrangement, suggested originally by the Dairy Expert, is to prevent the slaughter of useful heifers by dairymen who find it more profitable to sell milk than to rear calves. The rearing of these calves, and subsequently selling the heifers on their first calf, when taken by itself, is perhaps not a very sound financial proposition. On the other hand, these calves are usually the progeny of some of the deepest milkers in the State, which usually gravitate towards metropolitan dairies; and, in the circumstances, their indiscriminate slaughter is a distinct loss to the State herds. Moreover, from our point of view, the position has become complicated by the very high prices offering for meat of any kind. In the earlier days of the scheme we were able to secure recently dropped calves at a few shillings a head. During the year ending March 31 we purchased 29 of them at an average price of £1 7s. 8d., and, according to the Manager, many metropolitan dairymen are now rearing their own calves, which, of course, is quite satisfactory to us. During the same period we sold in the market nine cows on their first calf at an average price of £9 0s. 9d., whilst on March 31st, 1920, we had on hand 53 head of various ages, valued approximately at £272. The season which closed in March was an exceedingly poor grass year, and feeding operations were correspondingly costly. Our book loss for the season on these operations was represented by £90 5s. 4d.

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by C. A. LOXTON, B.V.Sc., Government Veterinary Surgeon.]

"D. H.," Mypolonga, asks is it a fact that Sudan grass is poisonous to stock? If so, at what stage of growth?

Reply—This grass belongs to the sorghum family, the members of which, under certain circumstances, may develop poisonous substances. This is most likely to take place if the plant is fed off before it is mature or if it is stunted in its growth. If the fodder is cut and allowed to wilt before being fed to stock it is quite safe to use. Many stockowners who graze off this grass without any discrimination believe that it has no ill effect as long as cattle are well fed and in good condition.

"A. S.," Kongorong, reports death of cows, and asks cause. Symptoms.—Refused to eat, drank very little, went totally dry, stiff in joints, and became paralysed, breathing very heavily. Inquirer reports another cow stiff in joints, but with normal appetite.

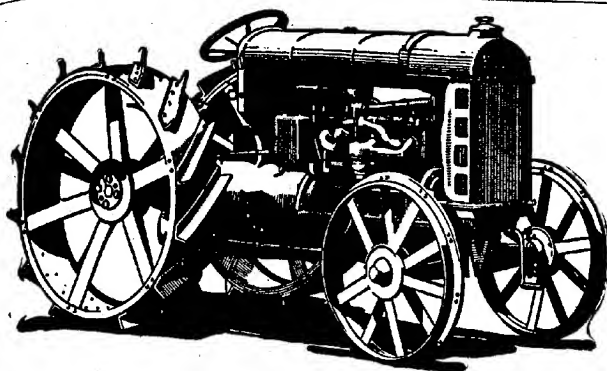
Reply.—The cause of death is progressive paralysis. You should adopt a liberal system of feeding. Supply salt and bone meal, either in the form of a lick or give it in the feed. Give the sick cow one flat teaspoonful of powdered nux vomica once daily. Mix this with a little treacle, and give on the tongue.

"F. W.," Meadows South, asks if it is profitable to purchase linseed and other forms of concentrated foods for dairy cows, and in what ratio it should be fed in conjunction with other fodders.

Reply.—The usual method of using concentrates is to allow 3lbs. to every 10lbs. of milk produced. An allowance of 1lb. of linseed meal is also desirable. For example, a cow producing 20lbs. of milk daily should receive, in addition to the bulk ration of chaff, &c., 3lbs. crushed oats, 3lbs. bran, 1lb. linseed meal. The amount of chaff required depends upon the pasturage, &c., available, say, 20lbs. This ration can be given in two feeds daily.

"A. G. S.," Port Lincoln, reports death of horses. Mare, 12 to 14 years old, took ill after two days' hard work. Stiff in all limbs, especially hind quarters, white discharge from nose. Animals hide bound and manure very dry. Another gelding is ill and showing same symptoms.

Reply.—The stiffness in the limbs, especially in hindquarters, suggests a mild form of toxic paralysis. This may be due to forage contamination, even though it appears of fairly good quality. I would advise a change of feed for the present. Use plenty of bran if you can obtain it. If this gelding has any difficulty in getting up you should put him in slings. Put him on laxative diet, and give him the following powders:—Strychnine sulph., 12 grains; powdered sugar, 2 drams (mix). Divide into 24 powders. Give one twice daily on the tongue. The Fowler's solution is quite good, and will not be affected by keeping if well corked.



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50, Franklin Street, Adelaide.

"C. H. T.," Parnna, has five-year-old gelding which takes bad after working. Animal lies down, and makes attempts as though trying to pass water.

Reply—I think it would be advisable to put him out of work for a week or two. Put him on mash diet. Examine his dung closely for sand. Give him one flat teaspoonful of powdered nux vomica mixed with a little treacle once daily on the tongue for a week.

"A. J. M.," Gawler, reports mare with heavy cough. Coat very rough, and animal eats but very small quantity of food.

Reply—Put her on soft food, and give her the following powders:—Powdered camphor, 4oz.; powdered belladonna leaves, 1½ozs.; powdered aniseed, 2ozs.; chlorate of potash, 1½ozs. (mix). Divide into 12 powders. Give one powder twice daily in the feed.

"O. W.," Streaky Bay, reports six-year-old gelding passes heavy yellow urine. Animal very fidgety, and is continually stamping its feet. Lately the urine has been of a dark-red color.

Reply—The symptoms point to the presence of a urinary calculus (stone). When present in the bladder or urethra these can be removed if the necessary skilled attention can be obtained. Give him 10 drops of hydrochloric acid in his drinking water once daily for a fortnight. Supply him with plenty of rain water to drink. Put him on laxative diet. Report again in two or three weeks.

### FATTENING SHEEP.

The following questions submitted by a South-Eastern agriculturist, and the replies thereto by the Superintendent of Experimental Work (Mr. W. J. Spafford) should prove of interest to stockraisers:—

1. Will sheep fatten on chaff alone?—Given good hay chaff, and animals not too old, sheep will fatten very readily, particularly in warm weather and if adequate shelter is provided. When being fed wholly on chaff, the sheep will need from 2lbs. to 2½lbs. per head per day, depending, of course, on the size of the animals.

2. How much grain per day would fair stores need to fit them for market, and how long would it take?—Grain alone should not be fed to animals, as it is quite essential for them to have some roughage, if they are to make good use of the expensive feedstuff; and so, providing that store sheep are on good picking, or are receiving 1lb. per head per day of good hay, 1lb. per head per day of grain will be sufficient to fatten good healthy animals, if the general conditions are not unfavorable. The length of time that it will take to fatten these animals will depend on such factors as type of animals, forwardness, quality of feed, regularity of feeding, and general feeding arrangements, so that it is impossible to state a fixed time; but, at the least, they should make a weekly gain in weight of 2lbs. per head.

## DEPARTMENTAL DOINGS.

### AMONGST THE AGRICULTURISTS.

During the month of March three Conferences of the Agricultural Bureau took place. Mid-Northern Branches met at Gladstone on March 8th; Franklin Harbour District Branches at Cowell on March 17th; and Yorke Peninsula Branches at Kadina on March 18th.

### HORTICULTURE, ETC.

The Horticultural Instructor (Mr. George Quinn) attended the Interstate Conference of Australasian Nurserymen. He also visited McLaren Flat, and examined vineyards reported to be affected with downey mildew. Specimens of the supposed mildew-infected leaves failed to reveal any development of the fungus when submitted to laboratory tests.

### FARM BUILDINGS, ETC.

The Field Engineer (Mr. J. Paull) has dealt with a number of applications for information respecting reinforced concrete tanks, silos, farm buildings, water supply, &c., and has made several visits to different districts, inspecting sites, and advising.

### BIRD LIFE.

Captain S. A. White, C.M.B.O.U. (member of the Advisory Board of Agriculture), visited Virginia and Ashbourne, and delivered lectures on the economic importance of bird life.

### GENERAL.

Mr. W. S. Kelly (Vice-Chairman of the Advisory Board of Agriculture) visited the South-East and lectured before the Kybybolite, Naracoorte, Kalangadoo, Glencoe, and Mount Gambier Branches of the Agricultural Bureau.

The Acting Secretary Advisory Board (Mr. H. J. Finnis) visited Virginia, Gladstone, Cowell, and Kadina during the month.

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## FERTILISERS AND THEIR USE IN THE HOME GARDEN.

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

Fertilisers are substances supplied to plants to make good any deficiency of the plant foods essential to their growth, and to enable one to understand the economical use of fertilisers, some knowledge of the essential plant foods, and how they are obtained by plants, is necessary.

Chemists find when they analyse plants that all of them contain:—Carbon, hydrogen, oxygen, sodium, magnesium, sulphur, chlorine, iron, silica, manganese, nitrogen, phosphorus, potassium, calcium, and although other substances are sometimes found, none of the above is ever absent, and so it is natural to consider that all of them are essential to plant growth, and with the possible exception of silica, experiments confirm this, for if any of these substances be kept from a plant it either does not grow at all, or else makes but a very weakly plant.

### WHERE PLANTS GET THEIR VARIOUS FOODS.

Nearly every individual plant that grows starts from a seed, which in most cases contains but very little material in it, so that practically all the mass comprising the plant is obtained from somewhere after the very small supply of food contained in the original seed (or cutting, tuber, bulb, &c.) is used up. Now, of the materials forming the plant the carbon (about 50 per cent. of the dry substance of plants) is obtained from the air, the hydrogen is obtained mainly from water, the oxygen (which, with the hydrogen, equals something over 40 per cent. of the dry substance of plants) is obtained mainly from water and air, and all other substances—mineral matters—are obtained by plants from the soil.

### HOW PLANTS GET THEIR VARIOUS FOOD SUBSTANCES.

*Carbon.*—This important part of plants is obtained from the atmosphere. All animals breathe in air, of which some of the oxygen is used in the combustion of the food eaten, and carbonic acid gas is breathed out, and all combustion of organic matter containing carbon, such as fires, decompositions, &c., also give off carbonic acid gas, and these two main sources keep up a constant and fairly regular supply of carbonic acid gas in the atmosphere. In the presence of sunlight, the green parts of plants have the power, which is fully used, of absorbing this carbonic acid gas, and retaining the carbon which it contains.

*Hydrogen.*—Water is a combination of hydrogen and oxygen, and is constantly passing through the growing plant, from roots to leaves and what hydrogen is wanted by plants, other than in water, they can secure by splitting up the water.

*Oxygen.*—Besides getting oxygen from water, the plants absorb free oxygen through their leaves in the absence of sunlight, and through their growing roots at all times.

**Mineral Matters.**—The mineral matters essential to plant growth are all secured from the soil, and, as far as is now known, the only way that these can enter the plant is in solution. The roots of plants are constantly absorbing moisture, which passes up the tissues of the plant, and most of it is evaporated from the leaves, and to our knowledge this soil moisture—other than gases—is the only substance taken up by plant roots, and so, for the mineral matters to enter the plant, they must be soluble in the soil moisture.

#### MANURING.

As we have no control over the supply of carbon to plants, and but very little over the hydrogen and oxygen, manuring can be defined as the making good of any deficiency of the mineral plant foods. But analyses of soils and field experiments have both shown that with very few exceptions all soils are supplied with sufficient of most of the requirements of crops for all time, the exceptions being nitrogen, potash, phosphoric acid, and in some cases lime, and so for practical purposes we can take manuring to mean the making good any deficiency of nitrogen, potash, phosphoric acid, or lime.

**Influences of the Various Fertilisers.**—Although it is usually necessary to apply all of the fertilisers where intense culture is practised—as is the case in all “home” gardens—if good results are to be secured for a long period of time, some knowledge is necessary of the influences of each one of them, so that they can be economically used for the different types of plants being cultivated.

**Nitrogen.**—Nitrogen is the plant food which encourages luxuriant growth in plants, and as such it must be present in sufficient quantity for garden plants from which much leaf development is expected. An excess of nitrogen in the soil tends to increase the susceptibility of plants to disease. The lack of nitrogen is often evidenced by poor, stunted growth, scanty foliage, and a general sickly yellow appearance. Nitrogen must be in combination before plants can use it, and as far as we know it must be combined up as a nitrate, otherwise it cannot be utilised. The soil bacteria, when properly encouraged, quickly convert other salts containing nitrogen into nitrates, particularly the ammonia salts, and slowly convert the nitrogen in organic matter, so as to be available to plants. By providing a full supply of organic matter, and encouraging the activities of the soil bacteria, applications of nitrogenous manures can be done without. The common forms of fertilisers supply nitrogen only are:—

**Nitrate of Soda.**—This is ready for the use of plants as applied, so is a very quick-acting form, and as such is very suitable for use in cold, wet soils where the bacteria are not very active. In heavy soils nitrate of soda has a bad effect on their mechanical condition by deflocculating the soil particles, thus making them very sticky, but this disadvantage can be overcome by using a mixture of half and half nitrate of soda and sulphate of ammonia, which should be applied as soon as mixed. Nitrate of soda is readily washed out of the soil, so should only be applied as a top-dressing after the plants have germinated. Owing to its quick action an application to plants that have been checked by insect attacks or through almost any reason, will help

them to recover very rapidly. Used on heavy land it liberates potash for the use of plants.

*Nitrate of Lime* is quite equal to nitrate of soda, providing that the same amount of nitrogen is applied, and has no ill effect on the condition of the soil.

*Sulphate of Ammonia*.—This substance is next to the nitrates in regard to the quickness with which it acts, and although it has to be converted to nitrate before becoming available, it does not take a long time when conditions are favorable. Sulphate of ammonia has no bad effects on soil conditions, but it reduces the lime content of the soil and leads to excessive acidity. This substance is not leached out of the soil very readily until converted to nitrate.

*Nitrolim* has given very useful results, and acts in a very similar manner to sulphate of ammonia.

*Potash*.—Potash appears to have special effect in encouraging the formation of the carbo-hydrates—sugars, starch, oils, &c.—and in promoting the growth of leguminous plants. As such, potash is a very important fertiliser for the “home” garden, because all the root plants, such as potatoes, onions, artichokes, dahlias, anemones, &c.; all the leguminous plants; all the fruits, especially the sweet ones; and all the nuts are particularly benefited by a plentiful supply of it. Potash also encourages extra vigor in plants, strengthens their stems, and tends to make them more resistant to diseases. Light, sandy soils contain but little potash, so applications of this fertiliser are quite essential if much growth is wanted. Heavy-textured lands, on the other hand are usually rich in potash, and applications of nitrate of soda generally liberate enough potash for full plant growth. The appearance of red coloring along stem and leaves on plants that should be green, and when the points of the leaves tend to die back, as a rule denote an absence of sufficient potash in the soil. Where potash is difficult to obtain, applications of salt, lime, gypsum, or nitrate of soda liberate this substance from soils. Potassic fertilisers have a bad effect on the texture of soils by deflocculation of the soil particles due to the formation of potassium carbonate.

*Muriate of Potash*.—Muriate of potash is the principal source of potash in this State, and originally came from the Stassfurt mines in Germany, but is now being received from the French mines of Alsace. This fertiliser is the most concentrated form in which potash is applied, and in normal times is cheaper per unit than are the other forms. In appearance it looks like dirty, coarse, common salt of a yellowish color, and as such can be easily handled, and will mix well with the other common forms of fertilisers. It has a tendency to deplete the lime content of the soil, so should only be applied where plenty of lime is present. Muriate of potash can be used for all plants except the likes of tobacco, potatoes, onions, &c., where the chlorine which it contains is likely to injure the quality.

*Sulphate of Potash*.—This form of potassic fertiliser is usually dearer per unit of potash than is the muriate of potash, but it can be used with safety for all plants, and also on soils rather low in lime content.

*Kainit, or Sylvinit.*—Kainit, like the two previous potassic fertilisers, is also obtained from the Stassfurt mines, and is the most common product of those mines, and sylvinit is got in Alsace. It is a mixture of a number of salts, but mainly common salt and sulphate of potash, and is essentially a low-grade potassic fertiliser, taking three to four tons of this to supply as much potash as will one ton of muriate of potash. As it contains a lot of chlorides, the same restrictions to its use as for muriate of potash also apply. Further, it has to be applied to the soil so that it does not come in contact with the seed, as it seriously affects the germination of them. It is specially suitable to crops that originated near the sea, such as beets, asparagus, &c.

*Phosphoric Acid.*—But few soils of the world contain much phosphoric acid, and Australian soils are notably deficient in this plant food, and where intense culture is practised the supply of this substance is soon used up, and in consequence the making good of the shortage of phosphoric acid by applications of phosphatic fertilisers is found to be necessary fairly soon after the cropping of most soils has been regularly undertaken. A full supply of phosphoric acid in the soil plays a special part by stimulating early root development and promoting general vigor to plants in the early stages of growth, by tending to counteract any tendency to rankness, by promoting early maturity, and by tending to the development of flowers and seed rather than leaf and stem. Phosphoric acid is commonly found in the world in combination with lime, and it is usually as a form of calcium phosphate that it is used as a fertiliser, the well-known kinds being:—

*Bonedust.*—This consists of the ground bones of animals, and as the calcium phosphate in bones is in an insoluble form, this fertiliser must be finely ground if plants are to get much of the phosphoric acid in the year that it is supplied, and, failing this fine state of subdivision, it is but slowly available. Experience has shown that finely-ground steamed bones and bone flour are good phosphatic manures for light soils poor in lime, such as sands and gravels, where much water is not used. Although bone products are good phosphatic manures, the user generally pays very dearly for his fertiliser, as the price per unit of fertilising material is much higher than can be obtained in other forms of manures. The demand for ground bone is always greater than the supply, and appears to be caused by the prejudice in favor of this form of fertiliser, which has been handed down for ages by crop growers. For a very long period of time, and until comparatively recently, bones in some form were one of the few forms of manure used by crop growers which gave them big increases in yields, and despite the increased knowledge of plant requirements, and the discovery of fertilisers to supply the deficiencies of plant food, many users of phosphatic manures still pin their faith on bonedust at no matter what price they have to pay for it.

*Basic Slag.*—Basic slag is obtained in the manufacture of steel from iron containing phosphorus, by combining up this phosphorus with lime, after it has been removed from the iron. The slag obtained, to make a good fertiliser, must be so finely ground that at least four-fifths of it will pass through a sieve having 100 meshes to the inch,

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and, when so ground, this fertiliser is a very good form in which to apply phosphoric acid to heavy clayey soils where there is a good rainfall, or where irrigation water is applied. This fertiliser is not nearly so soluble as is superphosphate, but it contains a high percentage of free lime, making it very useful for some conditions. Unfortunately, in South Australia, much use cannot economically be made of this form of fertiliser, owing to the high price asked for it. In England it is found to be worth per unit of calcium phosphate about five-eighths of the value of the unit of calcium phosphate in superphosphate, which means that when 36 per cent. superphosphate is worth £5 a ton, basic slag containing 36 per cent. calcium phosphate is worth £3 2s. 6d. Where special circumstances call for the use of basic slag to supply the phosphate acid necessary, the value of the fertiliser naturally increases above the comparative value shown above.

*Superphosphate.*—This is manufactured by treating insoluble calcium phosphates (either mineral or organic) with sulphuric acid, when the great bulk of the insoluble phosphate is made soluble in water. On practically all normal soils superphosphate is the most effective phosphatic fertiliser when equal amounts of phosphoric acid are compared, but for the full benefit to be received from applications of this fertiliser, the soil should contain an excess of lime (calcium carbonate), so that the free phosphoric acid which it contains combines with the lime; where sufficient lime is not present, the phosphoric acid combines with iron or aluminium, forming more or less insoluble phosphates, and so much of the phosphoric acid is lost to the plants which it is proposed to benefit. The soils, in which applications of superphosphate do not give the full beneficial effect are light sands and gravels deficient in lime, peaty soils containing sour humus, and sour soils generally. The effectiveness of this form of phosphatic fertiliser seems to be due to the fact that, owing to its solubility when it is put in the soil, even though it reverts very quickly, it is deposited in a very fine state of division throughout the soil in the neighborhood of the roots of the plants. Superphosphate has a wonderful effect in promoting rapid root development, and so is especially valuable to shallow-rooted plants, and short-lived crops which have to grow quickly. For the same reason it is very useful as an application in the early spring, to plants which have been badly checked in the winter, to give them a good quick start again.

*Raw Rock Phosphate.*—Deposits are found in various parts of the world containing phosphoric acid in large quantity, combined up mainly with calcium and to lesser extent with aluminium, and it is from the former—calcium phosphate—that the great bulk of the superphosphate is manufactured. Until comparatively recently but little of these mineral phosphates were used as fertilisers without treatment to change the form of phosphate, and the results secured in most cases were poor, but it is now known that, providing the calcium phosphate is very finely ground, it makes a really good phosphatic manure for certain conditions. It is a matter of common knowledge now that the continued use of superphosphate on sour soils makes them more sour, and it is here that finely ground raw calcium phosphate

is a suitable phosphatic fertiliser. As a general rule, it can be taken that finely ground raw rock phosphate can be used to advantage in sour soils, in peaty soils, and where the rainfall is heavy or where irrigation is practised. To make its use economical, it should be so finely ground that at least 60 per cent. is able to pass through a sieve with 100 meshes to the inch. Where nitrogen as well as phosphoric acid is to be applied, sulphate of ammonia and finely ground raw rock phosphate make a good mixture for the purpose, and the interaction between the two materials liberates the phosphoric acid more quickly than would otherwise be the case.

*Lime.*—Lime is so seldom absent from a soil, to the extent that plants cannot get enough for their proper growth, that it is hardly worth considering as a direct fertiliser. In some few cases, where organic manures are the only ones available, light applications of lime increase the growth of plants as the result of the plants being able to get their lime easily; but as these cases are so rare, and as lime is extremely important as an indirect fertiliser, it will be considered later under that heading.

#### COMPOUND FERTILISERS.

Of the common fertilisers providing more than one of the essential plant foods, the main ones are organic manures, and of them the following are the most important:—

*Farmyard Manure.*—This consists of the solid and liquid excrements, together with the bedding or litter provided, of the domesticated animals. On large holdings, where many animals are kept, this consists of a mixture of the droppings of different kinds of animals but the manure used on most "home" gardens is that from only one class of animal, and very often excreta alone, without litter of any kind. Farmyard manure has the experience of ages in its favor, and by many is considered the all-in-all as regards manures, and although its direct benefit as a carrier of plant food is not so very wonderful, its indirect value makes it the most important of the manures. Although farmyard manure consists of plants, and contains the bulk of the substances originally in the plants, but in changed forms, still, when being applied as a fertiliser, it does not contain nearly as much of any of the principal plant foods as are required, nor are they in the correct proportions for plants, nor do they all become available with equal rapidity. One ton of farmyard manure contains about 12lbs. to 17lbs. nitrogen, 5lbs. to 9lbs. phosphoric acid, and 13lbs. to 15lbs. potash, of which the nitrogen and phosphoric acid are but slowly available, and for most crops it is found necessary, even where liberal applications of this manure are given, to reinforce it with nitrogenous and phosphatic fertilisers. The indirect value of farmyard manure is mainly due to the facts that (1) it improves the texture of all soils, by loosening heavy soils and making them more friable and open, and by more or less loosely binding light sandy soils; (2) most soils are improved by additions of organic matter in that their water absorbing and retaining powers are increased, and they are enabled to resist droughts or dry spells much better than are soils lacking in organic matter; (3) its decomposition in the soil increases the warmth of the soil, thus helping

germination and growth generally, particularly in cold locations; (4) its decomposition in the soil leads to the liberation of other plant foods from their combinations with other substances; and (5) the large quantity of carbonic acid gas liberated during its decomposition very considerably increases the solvent power of the soil moisture. It is quite a common practice in small gardens to use farmyard manure as a mulch, but unless the manure was well rotted before being used for such a purpose it must be recognised that with such treatment the loss of nitrogen—the most expensive plant food that has to be supplied by growers—is fairly considerable. Farmyard manure should be put in the soil; any bulky organic matter, such as straw or the plants pulled from the garden, will make just as good a mulch as will the manure.

*Horse Manure.*—Horse manure is comparatively dry, and as such decomposes very rapidly, and so is more suited, than the wetter manures, to use in cold, wet soils. In its rapid decomposition much heat is given off, and so it is a good form of farmyard manure to use in hot beds and to force the growth of plants. To prevent as much loss as possible by over decomposition, the heap of horse manure should be pressed together as much as is possible, and not allowed to become dry.

*Cattle Manure.*—This manure is wet and dense, and so decomposes slowly without the development of noticeable heat, and as such is a suitable manure to use on light sandy soils, and it can be depended on to have a lasting effect.

*Pig Manure.*—Pig manure is very similar to cattle manure in being moist, of slow decomposition, and in being suitable for light sandy soils. It is usually much richer than is the former, however, and so more valuable.

*Sheep Manure.*—This being dry, is, like horse manure, very easily decomposed, with the generation of much heat, and fills the same bill as does the horse manure, but is a much richer fertiliser, and is exceptionally well suited for the forcing of plants.

*Bird Manure.*—The droppings of the domesticated birds, particularly those of pigeons and fowls, are really well supplied with the fertilising elements, and are suitable for application to all plants needing forcing.

*Guano.*—Guano consists of the partly decomposed droppings of birds, and in some few places has accumulated into huge deposits, which in hot, dry places has retained most of the original fertilising value of the droppings, and then is an extremely rich fertiliser. Unfortunately, most of the deposits of good guano have been worked out, and the most of this material now put on the market is obtained from places where much of the nitrogen has been leached out, and most of them are essentially phosphatic fertilisers, with a small percentage of nitrogen and phosphoric acid. Guano is a loose dry powder of a grey color in rich samples, becoming browner as the nitrogen contents gets lower, and has a characteristic odor of ammonia. It is usually friable, and easy to distribute. A good guano is naturally a



well-balanced manure, and the nitrogen is present in different forms, which take varying periods to become available, and so it is a safe manure for all crops not needing the care in use necessary with active single manures. When obtainable at a reasonable price, a good guano is a most suitable manure for orchards and gardens, and for intense culture generally, particularly for use by individuals not thoroughly understanding manures and manuring.

*Green Manuring.*—Where the mechanical condition of the land is bad, or where the land is of low fertility, the putting into the soil of a bulky green crop of some kind is of great benefit. Whatever kind of crop is grown as a green manure, it must be turned under the soil at flowering time; if left longer, it becomes too woody, and the decomposition of it is delayed. Where nitrogen is lacking, a leguminous crop such as peas, vetches, lupins, clover, &c., makes the best green manure crop, but where it is lack of organic matter and general poverty, any bulky crop that will decompose quickly does the job.

*Dried Blood.*—Dried blood is almost essentially a nitrogenous manure, but it always contains some phosphoric acid. Originating as it does from slaughter-houses, dried blood frequently contains other substances, and so is not always of uniform composition, necessitating great care when purchasing it. It should contain from 9 to 14 per cent. of nitrogen, and as it undergoes fermentation very readily in the soil, it is one of the most valuable of organic manures, particularly as about 96 per cent. of its total nitrogen is available to plants in the year of application.

#### INDIRECT FERTILISING MATERIALS.

Besides the materials already discussed, all of which are direct fertilisers, there are others which liberate plant foods from unavailable forms, and as such are called indirect fertilisers. The principal ones of these are lime, gypsum, and salt.

*Lime.*—Lime is not only an essential plant food, but has a very marked effect on the mechanical condition of soils, and on the liberation of other plant foods from their unavailable combinations. When present in soils in large quantities, lower percentages of potash, phosphoric acid, and nitrogen are adequate for maximum growth, so that applications of lime, even when the soil is not deficient in this substance, to some extent does away with the need of applications of other fertilisers. The mechanical effect of lime on the soil is (a) to loosen heavy clayey soils by flocculating the particles, thus creating an artificial coarseness of texture, and (b) to some extent it tends to make loose sandy soil somewhat firmer, by acting as a weak cementing agent. Its effect on fertility is largely due to (1) its power of neutralising the acids formed in the soil; (2) its help in keeping up the warmth and moisture of the soil, so aiding bacterial action; (3) combining with the nitric acid formed by nitrifying bacteria; (4) encouraging the activities of all the nitrogen gathering bacteria, including the root-bacteria of the legumes; (5) the direct and indirect liberation of plant foods, mainly potash and phosphoric acid; (6) the rapid conversion of organic matter to humus, and the retention of the nitrogen in this humus; (7) its power of counteracting the injurious

effects on plants of excesses of many of the soluble salts; and (8) its tendency to keep in check some of the plant diseases. As lime tends to sink rather quickly in the soil, it should always be applied directly on the surface, and be only worked into the surface soil, and for the same reason lime should be supplied frequently in small doses rather than in large doses once every few years, as was the practice in the past. A small dose every year, rather than heavy ones occasionally, is very necessary where quicklime is used, because a big excess of quicklime has a temporary ill effect on the useful soil bacteria that should be encouraged. As the quicklime applied to soils is very quickly converted to calcium carbonate, it must be this latter substance that does the work in the soil, and experience has now shown that this is so; but to get results from calcium carbonate (limestone, chalk, marble, &c.) equal to those from quicklime, it is quite necessary to have it ground very finely, and then the choice between the two is only a matter of price. A comparison between values of limestone and lime can be arrived at by reckoning that for soil dressings 1 ton of finely ground limestone is equal in value to 12cwts. of the quicklime made from similar limestone.

*Gypsum.*—Sulphate of lime, or land plaster, benefits some plants to a remarkable degree, especially the legumes and such plants that are dependent on potash. Although this has been known for a long time, no explanation could be given, but it now appears to be wholly due to the liberation of potash in the soil, and analyses of leguminous plants grown with and without applications of gypsum always show but slight differences in the percentages of lime and sulphuric acid, but a very great increase in the potash content of the plants grown on the treated land. Besides liberating potash, gypsum aids in the decomposition of organic matter, and absorbs and retains volatile ammonium compounds. Like all other indirect fertilisers, gypsum should be applied in small doses often, rather than in big doses at long periods, because in the latter case it will possibly liberate more plant food than is necessary, and great losses may occur by leaching.

*Salt.*—In some places the use of salt, either alone or in admixture with fertilisers, is a common practice, and is usually applied to those plants that are supposed to have originated near the sea shore. Salt liberates potash, and, providing the rainfall is heavy enough, or irrigation is practised, applications of it benefit all plants needing much potash. It should never be used unless the water supply is good, because a concentration of this substance at the surface ruins the mechanical condition of the soil, and prevents seeds from germinating there.

#### "COMPLETE" MANURES.

A "complete" manure is generally recognised as one containing all three fertilising materials—nitrogen, potash, and phosphoric acid—in proportions to suit the crop to which it has to be supplied. As all classes of plants require different proportions of the various plant-foods, to get ideal results with the use of "complete" manures, a different mixture would have to be used for each class; but this is not a practical proceeding, and so these mixtures are made somewhere

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near what are the average requirements of plants, and then for special cases additions are made of the extra plant foods required. The composition of various brands of "complete" manures vary considerably, but they usually contain:—

From  $2\frac{1}{2}$  to 5 per cent. of nitrogen,  
 From 8 to 15 per cent. of phosphoric acid,  
 From 2 to 7 per cent. of potash;

and then for special conditions either more nitrogen, potash, or phosphoric acid must be added to the soil.

#### IN THE "HOME" GARDEN.

For manuring the "home" garden, where the whole land is covered with plants (many of which make very strong growth), and which carries a heavy growth of plants most of the year, it must be remembered that, if the fertility of such land is to be kept up so that these big crops can be carried for a long period of time, at least as much plant food must be put back into the soil as is taken out by the plants. To be able to do this, some idea must be gained of what plants do remove from the soil, of the plant foods likely to become deficient in most soils, and in this connection the following figures can be taken as the average amounts taken by ordinary garden plants:—

Nitrogen—About 50lbs. per acre, or  $2\frac{1}{2}$  drams per square yard.

Phosphoric Acid—About 20lbs. per acre, or 1 dram per square yard.

Potash—About 50lbs. per acre, or  $2\frac{1}{2}$  drams per square yard.

Some of the plants commonly grown take much more of all of the plant foods than the above figures; others, of course, much less; but if these quantities are taken as a minimum, and are replaced each planting, sufficient plant food will be in the soil to produce good growth for a very long period of time. Of the common forms of fertilisers obtainable at present, and safe to use in average conditions, the amounts necessary to replace the removals will be:—

250lbs. sulphate of ammonia (20 per cent.) per acre, or 13 drams per square yard.

121lbs. superphosphate (36 per cent.) per acre, or  $6\frac{1}{2}$  drams per square yard.

96lbs. muriate of potash (52 per cent.) per acre, or 5 drams per square yard.

And in this connection, to help in the applying of such manures, it is as well to know that—

One teaspoonful of most fertilisers equals about  $\frac{1}{2}$ oz, or 8 drams.

One dessertspoonful of most fertilisers equals about 1oz., or 16 drams.

One tablespoonful of most fertilisers equals about 2ozs., or 32 drams.

#### COMPLETE MANURES FOR THE "HOME" GARDEN.

To be able to put a manure on the land containing the three fertilising materials will naturally simplify the operation, and can be done, but it must always be remembered that most nitrogenous fertilisers are very liable to be washed out of the soil, and so best results are usually

obtained by adding the other two ingredients and some of the nitrogen in a mixture, and then make up the necessary amount of nitrogen in two or three extra applications during the growth of the plants. Again, in all soils, except light sands, it is rarely necessary to make good all of the potash taken out of the soils by plants, because most soils are well supplied with potash, but it is only slowly available, and there is usually too little of this substance liberated in one year to make good all taken out of the ground, and so it remains necessary to add some potash. For most plants the following mixture:—

Superphosphate (36 per cent.), 2 parts,

Sulphate of ammonia (20 per cent.), 1 part,

Muriate of potash (52 per cent.), 1 part,

applied at the rate of 1oz. (2 teaspoonsful) to the square yard every planting, will give good results on all soils well supplied with lime and organic matter, providing that sulphate of ammonia is applied at the rate of 3½ drams (about ¼ teaspoonful) to the square yard twice during the growth of the plants.

#### HOME MIXING.

It is certainly advantageous for plant growers wishing to use mixed fertilisers to do their own mixing, because:—(1) When the materials are bought as separate articles there is small chance of their being adulterated; (2) the mixer knows exactly what forms the various plant foods are in, and takes no risk of inert forms being put in the manure, such as leather and hair waste, to supply the nitrogen, &c.; (3) every soil needs a different mixture if maximum results are to be obtained, and every type of plant needs a special proportion of the different materials, which can only be obtained by mixing on the spot; (4) it is more economical for growers to do their own mixing.

#### MANURES FOR SPECIAL PURPOSES.

In connection with the use of manures, where a big variety of plants is grown it must be remembered that although the use of the mixture already mentioned will prevent the fertility of the soil becoming too low, for maximum results special plants need special treatment. In this connection the following facts should not be lost sight of:—

Phosphoric acid must be put into the soil for all plants, as practically no soils are naturally well supplied with this plant food.

Nitrogen encourages luxuriant growth, and so all plants having greatest value in their leaves and stems should be well supplied with nitrogenous fertiliser.

Potash promotes the formation of flowers, seeds, bulbs, fruits, nuts, etc., and adds to the general hardiness of plants.

A plentiful supply of organic matter and lime in the soil allows plants to make maximum growth with less manure, as the bacteria are very active and liberate much nitrogen, and lime frees some of the potash held in combination.

#### AIDS TO SUCCESSFUL MANURING.

Manuring of plants is only one of the necessities tending towards full returns, and without the others would be useless, and further, the better the other conditions the greater will be the effects of the fertilisers.

The soil must be well supplied with organic matter to keep it in good mechanical condition, to control the moisture and warmth, and to make it a suitable medium for bacteria to live in.

The soil must be well supplied with lime to counteract excessive acidity, encourage bacteria, and liberate other plant food.

The soil must be well drained, otherwise water keeps it cold, prevents the easy access of air, and does not allow the roots of plants to travel far in search of their requirements.

The soil must be kept well aerated as the roots of plants are in need of air, so are the bacteria, and this supply of air does much towards the liberation of plant foods.

The soil must be well supplied with water by rain or artificial irrigation, otherwise plants cannot make full use of their opportunities.

#### GENERAL MANURING IN A "HOME" GARDEN.

To insure success in the ordinary home garden the following additions should be made to the soil annually, with extra of some of the fertilisers for special purposes:—

- 7lbs. to 10lbs. farmyard manure per square yard.
- 2ozs. lime per square yard.
- 1 dram phosphoric acid per square yard.
- 1½ drams potash per square yard.
- 2 drams nitrogen per square yard.

*Liquid Manure.*—A good liquid manure for forcing plants can be made by thoroughly mixing—

- 1½ozs. superphosphate,
- ½oz. sulphate of potash,
- 1½ozs. nitrate of soda,

in a full kerosine tin of water, and applying it to every 3 sq. yds. to 4 sq. yds. of garden.

#### MIXING FERTILISERS.

All fertilisers cannot be mixed indiscriminately without in some cases incurring losses of available plant food or affecting the mechanical condition of the mixture. Some mixtures lead to trouble in one of the following directions:—(1) Loss of nitrogen in ammonia, (2) reversion of soluble phosphates, (3) by producing unfavorable mechanical conditions. In this connection it is always to be remembered that the following of the fertilisers, obtainable in South Australia, should never be mixed:—

Lime and nitrate of lime must not be mixed with—

- |                      |                 |
|----------------------|-----------------|
| Sulphate of ammonia. | Superphosphate. |
| Nitrate of soda.     | Animal manures. |
| Muriate of potash.   | Guano.          |
| Kainit.              |                 |

Basic slag must not be mixed with—

- |                      |        |
|----------------------|--------|
| Sulphate of ammonia. | Guano. |
| Animal manures.      |        |

## UNIT SYSTEM OF VALUING FERTILISERS.

Fertilisers are usually valued on what is known as the unit system, and in this method a unit of any of the fertilising materials is taken as 1 per cent. per ton. For instance, the sulphate of ammonia at present on the market contains 20 per cent. nitrogen, which means that 1 ton of sulphate of ammonia contains 20 units of nitrogen, and, as this material costs £20 per ton, each unit of nitrogen in the sulphate of ammonia is worth £1. The same method of valuation applies to all fertilisers, and as it is compulsory for manure merchants to show the analysis of every manure for sale, a knowledge of unit values of the fertilising materials will enable the user to know exactly what he is paying for the part of the fertiliser useful to him.

## UNIT VALUES IN SOUTH AUSTRALIA.

Based on the actual prices to be paid for some of the fertilising materials in Adelaide at the present—1920—the following list of unit values has been built up, and from it the actual agricultural value of most of the forms of manures on our markets can be calculated:—

## AGRICULTURAL UNIT VALUES OF FERTILISERS.

*Adelaide, 1920.*

Plant Food	Unit.	Value of Unit. £ s. d.	Remarks.
Phosphoric acid ..	Water soluble calcium phosphate..	0 3 1	Actual value in 45 per cent. super.
	Citrate soluble phosphate .....	0 2 5	—
	Acid soluble phosphate .....	0 1 4	Actual value in raw rock phosphate
	Acid soluble phosphate .....	0 1 11	Inorganic manures, bones, &c.
	Total phosphate in basic slag ...	0 1 11	—
Nitrogen .....	In Nitrate of soda .....	1 1 3	—
	Nitrate of lime .....	1 1 3	—
	Sulphate of ammonia .....	1 0 0	Actual value
	Nitrolim .....	1 0 0	—
	Blood .....	1 3 0	—
	Bonedust, &c. ....	1 3 0	—
Potash .....	In Muriate of potash .....	0 10 10	Actual value
	Sulphate of potash .....	0 11 10½	—

The unit value, of course, changes with the fluctuations of the market, but can always be brought up to date by comparisons with actual cost of the various plant foods at any given time. The commercial value is governed by a law of supply and demand, but the agricultural value is not always synonymous with commercial cost, and so every plant grower has personally to decide what will give the biggest profit in his particular conditions, and then, despite the average agricultural value, such fertilisers will be the cheapest for him.

In connection with the above unit values, some manure analyses show nitrogen as its equivalent in ammonia, but it is easy to correct the valuation figures when it is known that 17 units of ammonia equal 14 units of nitrogen.

### COMPARISON OF NITROGENOUS FERTILISERS.

Many experiments have been conducted testing the availability of the nitrogen in various nitrogenous manures, and the results obtained show that when an equal quantity of nitrogen is supplied in the following fertilisers, plants have the power of utilising the amounts set alongside them, compared to 100 for nitrate of soda:—

Nitrate of soda . . . . .	100
Sulphate of lime . . . . .	100
Sulphate of ammonia . . . . .	94
Nitrolim . . . . .	94
Blood . . . . .	73
Bone meal . . . . .	65
Farmyard manure . . . . .	45

On these figures, the nitrogen in blood would only be worth 15s. 7d. per unit, and in bone dut, &c., 13s. 10d. per unit; but cropping experience proves this value to be higher than those figures, and further, particularly with blood, the advantage to manure manufacturers of these substances for their special mixtures is so great that the price of nitrogen is usually very high.

### UNIT COSTS OF SOME PRESENT OFFERINGS.

#### Potash.

Manure.	Per cent. Potash.	Cost per Ton.		Unit-Cost.
		£	s. d.	
Muriate of potash . . . . .	52	28	0 0	0 10 10
Sulphate of potash . . . . .	39	40	0 0	1 0 6

#### Nitrogen.

Manure.	Per cent. Nitrogen.	Cost per Ton.		Unit Cost.
		£	s. d.	
Nitrate of lime . . . . .	12.75	14	0 0	1 1 10
Sulphate of ammonia . . . . .	20.0	20	0 0	1 0 0
Nitrate of soda . . . . .	15.5	31	0 0	2 0 0
Blood manure . . . . .	11.0	15	0 0	1 7 4

#### Phosphoric Acid.

Manure.	Per cent. Calcium Phosphate.	Form of Phosphate.	Cost per Ton.		Unit Cost.
			£	s. d.	
45% superphosphate . . . . .	45	Water soluble	6	18 6	3 1
36% superphosphate . . . . .	36	Water soluble	5	15 0	3 3
30% superphosphate . . . . .	30	Water soluble	5	7 6	3 3
60% raw rock phosphate . . . . .	60	Acid soluble	4	0 0	1 4
Phosphate powder . . . . .	39	Acid soluble	3	0 0	1 7
Basic slag . . . . .	35	Total	10	10 0	6 0



*Compound Fertiliser.*

Manure.	Cost Per Ton.			Plant Food.	If Unit Value is—			Unit Cost will be—
	£	s.	d.		£	s.	d.	
Bone manure ...	9	5	0	Nitrogen, 5.25 % .....	—	—	—	1 6 2
				Acid soluble phosphate, 25 % .....	0	1	11	—
Bone manure ...	9	5	0	Acid soluble phosphate, 25 % .....	—	—	—	0 2 7
				Nitrogen, 5.25 % .....	1	3	0	—
Bonedust .....	9	5	0	Nitrogen, 3.75 % .....	—	—	—	1 6 4
				Acid soluble phosphate, 45 % .....	0	1	11	—
Bonedust .....	9	5	0	Acid soluble phosphate, 45 % .....	—	—	—	0 2 3
				Nitrogen, 3.75 % .....	1	3	0	—
Orchard manure. 11 0 0	11	0	0	Water soluble phosphate, 20 % ...	0	3	4	—
				Citrate soluble phosphate, 8 % ...	—	—	—	0 7 8
				Acid soluble phosphate, 4 % .....	0	1	4	—
				Nitrogen, 1.5 % .....	1	4	0	—
				Potash, 4.5 % .....	0	11	6	—
Orchard manure. 11 0 0	11	0	0	Water soluble phosphate, 20 % ...	0	3	4	—
				Citrate soluble phosphate, 8 % ...	0	2	8	—
				Acid soluble phosphate, 4 % .....	0	1	4	—
				Nitrogen, 1.5 % .....	—	—	—	2 10 7
				Potash, 4.5 % .....	0	11	6	—
Orchard manure. 11 0 0	11	0	0	Water soluble phosphate, 20 % ...	0	3	4	—
				Citrate soluble phosphate, 8 % ...	0	2	8	—
				Acid soluble phosphate, 4 % .....	0	1	4	—
				Nitrogen, 1.5 % .....	1	4	0	—
				Potash, 4.5 % .....	—	—	—	1 0 2

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## TOBACCO: SUGGESTIONS FOR THE HANDLING OF THIS CROP IN SOUTH AUSTRALIA.

### GROWING THE CROP.

#### METHOD OF GROWING TOBACCO.

As the seed of the tobacco plant is so extremely small, and as the grower must have full control of the spacing and number of plants in the field, the seedlings are raised in seed beds and transplanted to their positions when large enough.

#### TIME OF SOWING THE SEED.

Tobacco is essentially a summer-growing crop, and as such the seed is not sown until the spring. In most districts in this State where the crop will be successfully grown, the seed should be sown from August to October. As, in some seasons, early-sown seed beds are liable to suffer much from the attacks of fungi—mainly blue mould—it is a wise practice to sow seed beds in August, then a second lot in October.

#### SEED BED FOR TOBACCO PLANTS.

The most critical period in the growth of the tobacco plant is between germination and transplanting, so much care must be shown with seed beds.

#### SIZE OF SEED BED.

One acre of land will take on the average the plants grown in a seed bed about 9 sq. yds. in area, and as the bed must be kept free from weeds, it should be only 1yd. wide, and so 9yds. long.

#### SITE FOR SEED BED.

The bed should be situated in a free-working loam soil, with good natural drainage, fully exposed to the sun, and not shaded by growth or buildings during any part of the day.

#### BURNING SITE BEFORE SEEDING.

The land should be cleared of surface rubbish, such as weeds, stubble, &c., and then burnt. As too much of the soil organic matter will possibly be burnt if the fire rests directly on the surface, poles 3in. or so in diameter should be placed across the plot to carry the fire, and on these fuel, such as dry bushes, straw, &c., will be piled to a height of 4ft. The fire should be started on the lee-side of the heap, to ensure a slow burn.

#### PREPARING THE SOIL OF SEED BED.

The unburnt pieces of fuel, cinders, &c., should be raked off, 2lbs. of superphosphate (or bonedust) and 1lb. nitrate of soda (or sulphate of ammonia or dried blood) should be applied to the bed, and the land then worked finely to a depth of 3in. or 4in.

#### BOARDING OF SEED BED.

As the young plants must be protected from frost at night and excessive drying during the day, hardwood boards 9in. to 1ft. wide should be placed around the beds, with the top edge about 6in. above ground level. Cheese cloth, hessian, old bags (preferably bran bags), etc., can then be stretched over the beds as a protection.

#### SOWING THE SEED.

The seed is so small, and the amount necessary to sow so little (a tablespoonful to 50 sq. yds.), that it should be mixed with about 20 times its own bulk of sifted wood ashes, dry sand, or bonedust, and be sprinkled from the fingers backwards and forwards across the seed bed, immediately after having watered the bed. The only covering of the seed necessary is to tightly press down the surface with a board or such like, and then cover the whole bed with hessian, &c.

#### WATERING THE SEED.

The seed bed must not be allowed to dry once the seed has been sown, and it must not be made too wet, so only sufficient water must be used to keep the bed damp all the time.

#### WATERING THE PLANTS.

According to the weather conditions at the time, the seed will germinate in from 10 days to six weeks from sowing, and about eight weeks after germination should be ready to transplant.

Only very young plants require the soil being kept continuously moist, and when they are half-grown the beds should only be watered when the plants show the first sign of wilting. Best results are likely to be obtained if the beds are only watered in the evening, and not during the day, when the sun is shining.

#### PROTECTION OF THE PLANTS.

The hessian covering should be kept over the plants until they are well established, and until the danger of frost is over—indeed, in most cases, it is wise to remove the covering only a few days before transplanting, so as to harden-up the plants. The first day that the cover is removed should be a dull, cloudy one, otherwise the plants will suffer considerably.

#### FORCING THE PLANTS.

The aim of the grower should be to produce well-developed, strong plants for transplanting, and this will best be done by keeping beds absolutely free from weeds, and by thinning out the plants, if too thick, so that each one occupies, approximately, 1 sq. in. of space. If the plants are not strong and healthy when they have made their fourth leaf, they should be watered once a fortnight with a solution of nitrate of soda, at the rate of 50galls. water, in which 6ozs. of nitrate of soda has been dissolved, to every 100 sq. ft. of seed bed; in some cases a watering every fortnight with 50galls. water in which 8oz. sulphate of potash has been dissolved, to every 100 sq. ft. of seed bed, is also necessary to force the plants.

### PREPARATION OF THE SOIL FOR THE CROP.

Good soil preparation is quite essential, and the longer the land is exposed after ploughing the better, and so autumn ploughing gives the best results in most soils, and at latest the land should be ploughed up in early spring.

As the crop is deep rooted, deep ploughing should be practised, and if this is not done until the spring, it should immediately be followed by a heavy roller, and then be cultivated.

Between ploughing and transplanting the land must be kept well worked to keep down all weeds, and to produce a good friable condition of the soil.

Just a short time before transplanting the land should be ploughed to a depth of about 5in., and, according to condition, be immediately harrowed, or rolled and then harrowed.

### MANURING THE CROP.

For the first crop of tobacco that any particular block of land may carry, an application of 2cwts. superphosphate should be all the fertilising necessary, except where the soil is "sour," which must be corrected by an application of at least 10cwts. lime per acre. Superphosphate will be drilled in, and lime (if necessary) broadcasted, some little time before transplanting.

After the first crop, particularly so if the soil is not very fertile, sulphate of potash (up to 2cwts. per acre), as well as lime (up to 4cwts. per acre), and superphosphate (1cwt. per acre) must be applied annually.

### TRANSPLANTING THE TOBACCO PLANTS.

The plants are ready to put into the field when they have grown leaves from 2in. to 3in. long.

All plants should be planted the same day as removed from seed bed. They should be put in rows, and spaced about 3ft. apart each way.

Deep planting gives much better results than does shallow planting, and the plants should be put in so that the soil pressed around them holds the outside leaves in an upright position, so protecting the heart of the plant.

All gaps in the rows caused by plants dying should be replanted as soon as the plants die.

### CULTIVATION OF THE CROP.

As soon as the rows of plants are distinctly visible, the land should be horse hoed to loosen the soil and keep down weed growth.

Shallow cultivations should repeatedly be given up to the time that the plants become too large to allow the cultivator through the rows. This will usually mean three or four cultivations.

The soil around the plants should be kept loose by hand hoeing.

### TOPPING THE PLANTS.

The flower bud will appear about 10 weeks after transplanting, and must be carefully nipped out, so as not to injure the leaves that are left, as soon as it appears.

When topping, the number of leaves to be left on the plants is controlled, and if the plants are making fairly good growth, 16 to 18 leaves (exclusive of the four bottom ones, which are retained to keep the other leaves off the ground) will be left. If the crop is not growing well, the number of leaves left must be reduced.

#### DESUCKERING THE PLANTS.

After topping, suckers appear at the base of the leaf stems, and must all be taken off before they reach 3in. in length. This will probably have to be done three times.

#### RIPENING OF THE CROP.

The tobacco crop should reach maturity and be ready for harvesting in from six to eight weeks after topping.

(To be continued.)

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## THE POULTRY TICK.

Nuttall and other authorities describe the poultry tick (*Argas Persicus*) as noctambulatory (or, as moving about at night only). While this is true as regards the nymphs and adult ticks, it is not so as regards the newly hatched specimens, the larval form.

On many occasions I have pointed out the fact that ticks of all ages and sizes are equally to be guarded against, and that one is as deadly as another, says the Poultry Expert (Mr. D. F. Laurie). The great difficulty in grappling with this serious scourge is the lack of observation on the part of people generally; and further, a widespread ignorance of both poultry and parasites.

The poultry tick has spread over a very wide area in Australia. The extent is known here, but in the other States there does not seem to be much practical knowledge of the ticks—their habits and the best methods to adopt when the battle has to be fought.

In town areas (country and suburban) the tick passes from one property to another by way of fences, boxes (used as nests), old bags carried from one place to another. Poultry breeders exchange birds and so introduce the pest. A clean crate is placed, even for a night, adjacent to an infested one, and so conveys the pest to fresh fields. Practically all these methods of contamination fit in with the nocturnal habit of the tick.

### LARVAL TICKS IN DAY TIME.

On hot days the newly hatched tick, known as a larva, emerges from its haunts in cracks, &c., in poultry houses, and will travel about and spread the infection. It will, moreover, attack birds. On several occasions I have seen, about mid-day, large numbers of larval ticks wandering about the woodwork of infected poultry houses. That this is their habit will account for the fact that clean crates of clean poultry may be infected through travelling during day time on a tick-infected carrier's vehicle, or in a vehicle containing a tick-infected crate. I know of a recent case where a waggon was sent to the blacksmith to have the tyres cut and shut. On removing the tyres many full-grown poultry ticks were found in the spaces between the tyre and shrunken woodwork. This vehicle came from tick-infested premises, and clean poultry in crates would, if conveyed on such a vehicle, have been infested by the travelling larval ticks. These larval ticks, before they feed, are like very small light-grey spiders—they belong to the same family (*Arachnidae*)—they are six-legged at this stage. After a feed the shape is altered, and by reason of the ingested blood they are dark-bluish brown in color and much enlarged. In this stage they are frequently found closely adherent to the fowl. It is noteworthy that even in the larval stage they transmit to their victim the spirochete, which is the organism causing poultry tick fever (*Spirochaetosis*).

Kerosine, or 10 per cent to 20 per cent. kerosine emulsion, is the safest, handiest, and most reliable agent for their destruction. Tick-infested premises should be dismantled and every square inch thoroughly treated with either pure kerosine or boiling kerosine emulsion. Spraying, as generally carried out, is a useless method; the proper way is to flood all cracks and crevices and saturate all woodwork. Ticks will congregate between two over-lapping sheets of corrugated, galvanized iron.

A golden rule, which all poultry keepers should adopt, is to suspect the presence of ticks and to be continually searching for them. A case is known where a poultry farm was successfully operated for three years, and many hundreds of fine fowls were bred and prospered. Yet a sudden, and to the owner, unaccountable outbreak of trouble occurred. The matter was investigated by one of the inspectors and the premises found to be literally swarming with ticks. Quite a large proportion of poultry houses in this State are infested, and many owners are quite apathetic.



The John Tassie Memorial Library. Presented to the Roseworthy Agricultural College by Mr. John Tassie (Managing Director of D. & W. Murray, Ltd.) as a memorial to his father, John Tassie, a former student of the College who was killed in the late war. The library was formally opened and handed over to the College on Friday, March 18th, by His Excellency the Governor (Sir W. E. d. A. Weigall, K.C.M.G.).

## ORCHARD NOTES FOR APRIL IN SOUTHERN DISTRICT.

[By C. H. BEAUMONT, Orchard Instructor.]

If you are intending to plant oranges or lemons, it is quite time they were attended to. It is good to put a screen over the newly planted tree to help it over the frosty season. A bran bag fixed to stakes, so that the tree is protected from the rising sun, shading one side and the top, will be very effective. Have your trees fumigated before they leave the nursery, so as to kill all scale pests. Also, see that the soil about the tree is free from weeds.

I am grieved to see so many apples and pears wasting on the ground. These windfalls and culls are good material for vinegar, and there is a good demand for them. Or if they are crushed and pressed, the juice is readily saleable. Many of the apples would dry and make a valuable product. Ripe apples and pears are excellent food for stock.

Ground should be prepared for extension of the orchard; plough and open the soil as early as possible, leaving the holes open until the trees can be obtained.

Do not forget to spray all trees which were very badly affected by fungus pests with Bordeaux mixture.

If you intend to graft any trees or vines this season, mark the trees from which you wish to get your scions. Careful selection will mean much to you in the future profits.

When you are about to prune, keep all the diseased trees and vines until the last, and burn the cuttings on the spot. Carefully boil the secateurs or dip in formalin before again using.

Visitors to vineyards in other States where "downy mildew" exists, who intend to return to their own vineyards, should wear some old overalls and boots, and leave them "over the border" for some future visit, and not risk infecting South Australia.



## TOBACCO IN SOUTH AUSTRALIA.

Following his recent visit to South Australia, the Victorian Tobacco Expert (Mr. Temple A. J. Smith) has reported:—I have to report having on the 22nd and 23rd February inspected tobacco plots growing at Ashbourne, Mount Barker, Kenton Valley, and Williamstown. Of these, Mr. Daddow's plot at Mount Barker is the most promising. The Warne and Yellow Pryor varieties are of fair size, and are coloring well as they ripen, a sign that, when cured, the color will be good. The texture also is likely to be satisfactory, and so far as I could test combustion by burning the dried leaves on the bottom of the plants, a good ash and fire-holding capacity seem to be assured. On the whole, I consider this plot is so promising that I would suggest the cigarette and pipe varieties should be flue-cured this season, after which test a definite opinion could be formed of the actual value of the leaf.

Mr. Daddow has a shed of which a portion could easily be converted into a useful flue-curing barn, sufficient for this season's test, at a cost of, approximately, £20 for timber, iron, and lining. I have left directions for curing, and feel confident that a fair proportion of good cigarette and pipe tobacco can be cured from this crop.

### A HARD TEST.

The test has been rather a hard one, as the season has not been good for tobacco, and it is evident that with better weather conditions the crops seen would have been larger. Notwithstanding this difficulty, many well-grown plants are in evidence.

The cigar varieties on Mr. Daddow's plot have also grown well, but are not as promising for quality as the two mentioned for cigarette and pipe tobacco. I would certainly recommend that a flue-curing test be carried out.

Of the other plots, Mr. A. S. South, of Ashbourne, has some nice tobacco, which I have suggested to be air-cured this season, and Messrs. Forrester, of Kenton Valley, and Hammatt, of Williamstown, also have some nice plants; but the quantity in these cases is too small to warrant flue-curing. At the same time, they give satisfactory evidence that tobacco of fair size and quality can be produced on their soils.

There appears to me a really good prospect of good leaf being grown at Mount Barker, Ashbourne, Kenton Valley, and Williamstown, the places at which tests have been carried out; and there are probably other districts to be found suitable in your State. At present cigar varieties do not promise as well as the cigarette and pipe tobaccos.

I would like to say, in conclusion, that Messrs. Finnis, Spafford, and Opie gave all the assistance possible during my visit, and, thanks to the excellent arrangements made, a large area of country was inspected in a short space of time, my visit occupying only two and a half days, including travelling.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

### DISTRICT CONFERENCES.

During the month of March, Conferences of the Agricultural Bureau were held at Gladstone, Cowell, and Kadina.

#### MID-NORTHERN DISTRICT.

Delegates from Branches situated in the Mid-Northern District met at Gladstone on Tuesday, March 8th. The Department of Agriculture was represented by Mr. C. J. Tuckwell (Chairman Advisory Board), Professor Arthur J. Perkins (Director of Agriculture), Mr. Geo. Quinn (Horticultural Instructor), Mr. H. J. Finnis (Acting Secretary Advisory Board), and Mr. F. C. Richards. The chair was occupied by Mr. R. H. Coe, and the opening address delivered by Mr. C. J. Tuckwell.

Papers were read by Mr. E. T. Hollitt (Gladstone) on the subject, "The Cultivation of the Soil"; Mr. W. J. Venning (Crystal Brook) on "Co-operative Handling, Marketing, and Financing of all Produce from the Land, and Purchasing Farm Requirements"; Mr. S. J. Broadbear (Port Germein) on "Cutting, Stooking, and Stacking Hay"; and the Crystal Brook Branch submitted a report on the wheat variety tests which had been conducted by that Branch.

Considerable time was devoted to the discussion of a number of questions in Free Parliament. At the instance of Mr. J. Darley (Narridy) the following resolution (dealing with the marketing of the present season's wheat crop) was carried:—"That the farmers are not satisfied with the system of dockage, and protest against the incompetency of the persons in charge." Mr. Darley then moved, "That the system of weighing adopted by the Wheat Board is unfavorable and unjust." This was carried. It was further resolved, "That this Conference protests against the action of the Wheat Board in stacking docked wheat with good f.a.q. samples at receiving centres."

Various questions submitted by delegates were replied to by the visiting officers of the Agricultural Department. It was decided that a Conference should be held at Laura in 1922.

At the conclusion of business visiting delegates and officers of the Department of Agriculture were entertained by the Gladstone Branch.

#### FRANKLIN HARBOR DISTRICT.

Branches situated in the vicinity of Franklin Harbor met in Conference at Cowell on Thursday, March 17th. The Department of Agriculture was represented by the Superintendent of Experimental Work (Mr. W. J. Spafford) and the Acting Secretary of the Advisory Board of Agriculture (Mr. H. J. Finnis). The opening address was delivered by Mr. H. J. Finnis.

In the course of proceedings, papers were read by Mr. P. G. Wheeler (Elbow Hill Branch) on "Running a Farm Single-handed"; Mr. W. T. Cooper (Elbow Hill Branch), "Value of the Agricultural

Bureau to the Farmer"; Mr. W. G. Smith (Miltalie Branch), "Increasing the Grazing Capacity of the Land"; and Mr. J. H. Kruger (Yaduarie Branch), "Shearing Small Flocks and Preparing the Clip for Market." A number of subjects and questions which had been previously submitted by Branches were discussed in the course of Free Parliament. It was resolved, "That in the opinion of the Conference it is desirable that steps should be taken to insist on wheat-buying agents using standard machines for determining the bushel weight of wheat." A resolution was carried to the following effect, "That in the opinion of the Conference the Government should, in opening up new hundreds, take steps to insure the preservation of the natural scrub on any places that are likely to drift in the event of the timber being removed." It was decided that the next gathering should be held at Cleve in 1922.

#### YORKE PENINSULA DISTRICT.

At Kadina on Friday, March 18th, the Yorke Peninsula Branches met in Conference. The gathering was attended by the Superintendent of Experimental Work (Mr. W. J. Spafford) and the Acting Secretary of the Advisory Board of Agriculture (Mr. H. J. Finnis) represented the Department of Agriculture.

The Conference was confined to two sessions, during the course of which papers were read by Mr. H. McEvoy (Bute Branch) on the subject, "Bleached Wheat"; Mr. C. S. Lee (Paskeville Branch) on "Bulk Handling of Wheat"; Mr. W. F. Correll (Kadina), "Preventing Sore Shoulders of Horses." A paper, prepared by Mr. J. S. Sykes, of the Paskeville Branch, on the subject, "Bookkeeping for Farmers," was read by Mr. S. Ganson. Numerous questions that had been previously submitted by Branches were discussed at length, and in the course of Free Parliament the following resolution was carried:—"That the Wheat Harvest Board be asked to determine the relative milling values of bleached and unbleached wheat by gristing 50 bags of each."

#### IMPORTS AND EXPORTS OF FRESH FRUITS, PLANTS, ETC.

During the month of February, 1921, 3,615bush. of bananas, 380bush. of fresh fruits, 1,877 bags of potatoes, 10 packages of bulbs, 20 packages of seeds, and 14,522 empty wine casks were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts, 1885 and 1910. Of these, 57bush. of bananas and 6bush. of pineapples (overripe) were destroyed.

Under the Federal Commerce Act, 7,008bush. of fresh fruit, 193bush. of dried, and 1 package of jam were exported to overseas countries. These were consigned as follows:—For London—83 packages of dried fruit, 1 package of jam, and 6,947 packages of apples. For New Zealand—61 packages of grapes. For Batavia—50 packages of dried fruit.

Under the Federal Quarantine Act, 3,776 packages of seeds, etc., were examined and admitted from oversea sources. Of these, 5 packages of mace were fumigated.

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Thursday, March 3rd, there being present Mr. W. S. Kelly (Vice-Chairman), the Director of Agriculture (Professor Arthur J. Perkins), the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch), Colonel Rowell, Captain S. A. White, Messrs. T. H. Williams, F. Coleman, A. M. Dawkins, H. Wicks, and the Acting Secretary (Mr. H. J. Finnis). Apologies were received from Messrs. C. J. Tuckwell, Geo. Jeffrey, and W. Auld.

*Construction of Tanks on Eyre Peninsula.*—This subject was again brought before the meeting, and it was decided to defer the matter for six months.

*Refrigerating Car for Eyre Peninsula Railways.*—The request of the Conference of Eyre Peninsula Branches that a refrigerating car might be placed on the Eyre Peninsula railways for the carriage of perishable goods was reported on by the Railways Commissioner, to the effect that the circumstances at present did not warrant the running of a refrigerating car, and there was no ice plant at Port Lincoln. On the suggestion of Captain White, the Secretary was instructed to ascertain from the Branches the extent to which the refrigerating car would assist them and the business that would be likely to accrue therefrom.

*Improvement of Dairy Sires.*—Mr. W. S. Kelly submitted the following proposal for the improvement of dairy sires:—Annual sales of dairy bulls to be held at such centres as the demands seem to justify; no bulls shall be offered at such sales that do not comply with the following conditions:—(a) Pure bred and eligible to entry in herd book; (b) the progeny of officially tested stock, showing satisfactory performance records, the butter fat standards for the various breeds to be decided by a committee of experts; (c) true to type and well grown; and (d) passed the tuberculin test, the Government to pay a bonus to purchasers of 25 per cent. of purchase-money at end of the first year, and 12½ per cent. at end of the two following years. Applications for bonus to be made on forms issued at sale, and indorsed by auctioneer and Government representative. The bull to be available for service of at least 40 cows in the district at fee of 5s. a head. The names of owners and dates of service to be supplied. The bull to be yarded, and kept in good condition. The board expressed its approval of the principle involved in the proposals, and deferred consideration to the next meeting.

*Planting Trees for Firewood.*—A communication was received from the Renmark Irrigation Trust intimating that they were considering the advisability of establishing a firewood plantation on land which was irrigable and subject to flood in high rivers. Information was sought as to the best varieties of trees to plant and suggestions as to

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### TO THOSE WHO HAVE OR ARE ABOUT TO MAKE THEIR WILLS.

A STRIKING INSTANCE OF THE RISK OF APPOINTING PRIVATE EXECUTORS.

"The death of James Gordon Bennett, the wealthy owner of the NEW YORK HERALD, took place not very long ago. Mr. Bennett appointed his personal friend, James Stillman, an executor. Mr. Stillman died before any progress had been made in settling the Bennett Estate.

He had appointed John W. Sterling, the famous New York lawyer, an executor of his estate. Before Sterling could begin work he died suddenly while fishing in Canada.

Sterling appointed James O. Bloss, the New York banker, executor of his estate. But within a few weeks the third death in the chain occurred. The estates of Bennett, Stillman, and Sterling aggregated about 75,000,000dols. (say £15,000,000 sterling).

"Old Colony News Letter."

"From our standpoint the principal lesson is this:—The long interlocking complications that arise after a man's death, during which the families are left to shift the best they may while the tedious grind of untangling his affairs drags through the Probate Court, gives irresistible force to the argument for A TRUSTEE COMPANY AS YOUR EXECUTOR, AN EXECUTOR WHO NEVER DIES OR IS SICK, AND IS FOREVER 'ON THE JOB.'"

"Old Colony News Letter."

SEND FOR FREE BOOKLET.

the method of planting. On the motion of Colonel Rowell, seconded by Mr. W. J. Colebatch, it was decided to transmit the matter to the Conservator of Forests, with a request that the information sought should be supplied.

*Babcock Testers for Branches of the Bureau.*—The Williamstown Branch asked that Babcock testers of various sizes might be purchased by the Government for hiring out to Branches of the Bureau. The Secretary was instructed to suggest to the Branch that they purchase a tester on co-operative lines.

*Motor Vehicles Tax.*—The Mallala Branch sought information as to whether motor tractors were liable to taxation, and if the tax was rated on the drawbar horsepower or pulley horsepower. The Secretary was instructed to forward the question to the Registrar of Motor Vehicles for an expression of opinion.

*Apple Eating Campaign.*—The following resolution was received from the Blackwood Branch:—"That the Advisory Board be asked to inaugurate an apple eating campaign similar to that of 1915." After the matter had been fully discussed, the Secretary was instructed to advise the Branch that the Board considered that the matter did not come within their powers of jurisdiction.

#### RESOLUTIONS FROM CONFERENCES.

*Noxious Weeds Act.*—The Conference of Upper Northern Branches carried the following resolution—"That this Conference requests the district councils to see that all noxious weeds are destroyed." On the motion of Mr. Dawkins, seconded by Mr. Coleman, the Board decided—"That so long as the administration of the Noxious Weeds legislation is in the hands of local governing bodies the Act will remain a dead letter."

*F.A.Q. Standard.*—A resolution asking that the f.a.q. wheat standard should be fixed early in January was also received from the Upper Northern Conference. The Board decided to forward the matter to the Chamber of Commerce.

*Inspector of Apiaries.*—The Conference of Lower Northern Branches resolved—"That this Conference is of the opinion that the time is opportune for the appointment of an Inspector of Apiaries." It was decided to forward the matter to the Minister of Agriculture, with the support of the Board.

*Rat Day.*—Captain White again directed the attention of the Board to the rapidity with which the black rat was spreading over the country. He suggested that it would be a good plan if a day was set apart when all landholders might be asked to make a systematic war against the pest.

*New Members.*—The following names were added to the rolls of existing Branches:—Renmark—B. C. Nichas, D. J. Hamdorf, C. J. Christensen, A. S. P. Basev; Clare—Brother Boehmer; Williamstown (Women's)—Mesdames Warren, sen., Cundy, D. Coleman, G. Cundy, W. Gower, J. Green, J. S. Hammat, L. T. Hammat, Jno. Hamilton, Geo. Hamilton, H. Harris, W. L. Harris, Jno. Haworth, D. Lane,

W. Pinson, A. W. S. Wild, Jno. Wilson, Misses Hintz, O. Childs, E. Spencer; Lone Pine—E. Seidel, L. Winton; Williamstown—F. E. Rix; Mallala—G. W. Symes; Lameroo—J. H. Kernich; Glossop—N. J. Bambrick, F. Garrett, R. Jeffery; McLachlan—G. G. King. C. E. Beaty, A. C. Vial; Arthurton—K. S. Roads; Petina—O. Whittaker; Barmera—A. M. Black, L. Crotti, L. R. Davies, W. P. Webb; Hookina—S. W. Scriven; Lenswood and Forest Range—F. M. Hackett, T. Lawson, G. H. Schultz; Lone Gum—A. M. Nelson, G. Gale, E. O. Clancy, H. N. Polden; Williamstown—A. Williams, W. C. Smith, G. Hamilton, D. Bain, W. Lane, A. W. Wild, J. Hamilton. W. G. Patterson, P. A. Buckley, F. Marriott, M. Dawson, W. Gilbert, jun., W. S. Wilkin; Wirrabara—D. McKeand, A. Burford, jun., M. W. Hollitt; Coonalpyn—A. E. Gurner; Elbow Hill—W. T. Story; Berri—H. Schulze, J. E. Harrington; Ramco—A. Jones; Black Springs—E. I'Anson, H. Hersey; Lone Pine—C. H. W. Lake, H. Goers, T. Wallace, jun., R. Homburg, T. Bogner; Milang—C. Clarke, L. Kempe, F. Barwick; Taplan—R. S. Furness; Miltalie—R. E. Pett, T. J. McEachen.

## MURRAY BRIDGE HERD TESTING SOCIETY.

### RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1920.

Dairy Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk for Month.	Butterfat for Month.	Average Milk per Cow.	Average Butterfat per Cow for Month.	Butterfat per Cow for Three Months.
			lbs.	lbs.	lbs.	lbs.	lbs.
1/A	12	11.77	6,345.5	300.39	528.79	25.03	81.36
1/B	14	13.10	10,266	436.46	733.29	31.18	87.54
1/C	45	32.84	22,368.5	913.54	497.08	20.30	70.90
1/D	20	14.65	6,048	300.44	302.40	15.02	50.40
1/E	14	12.32	7,703	383.07	550.21	27.36	60.32
1/F	11	9.16	6,637	248.59	603.36	22.60	73.47
1/G	40.06	33.91	33,105.5	1,189.13	826.30	29.68	90.18
1/H	15	11.55	7,837.5	336.18	522.50	22.41	55.39
1/I	15	14.48	11,923	448.38	794.87	29.89	91.99
1/J	16.42	16.42	13,451	547.12	819.22	33.32	85.45
1/K	14	12.52	7,591	325.74	542.21	23.27	59.71
1/L	13	13	7,812	326.09	600.92	25.08	87.20
1/M	19.10	16.55	8,707.5	403.49	455.97	21.13	60.32
1/N	20	19.35	12,321.5	485.42	616.08	24.27	50.61†
1/O	26	23.87	15,506.5	732.59	596.40	28.18	28.18*
1/P	21	15.06	10,742	400.70	511.52	19.08	19.08*
1/Q	18	15.84	10,501	418.82	583.39	23.27	23.27*
MEANS for December .....					593.21	24.77	—
MEAN per month, October to December .....							24.64

\* For one month only

† For two months only.

### ST. JOHN'S WORT.

In consequence of a report that St. John's wort had made its appearance in the Hills district in South Australia, information was sought in Victoria, where they have had considerable experience of this weed, as to means of eradication. In response, the Victorian Department of Agriculture has courteously supplied the following information:—

"Our experience shows that the use of chemicals against St. John's wort is very costly owing to the necessity of so often having to make a second and even a third application before all the roots are entirely killed. The application of dry salt, at the rate of not less than 3 tons to the acre, has given good results. The best method of applying salt is in the form of strong brine; this is sprayed over the plants during hot weather, when the plants are sending up their flower stems.

"The use of liquid salt is a saving in the amount of salt necessary, but this saving is often outweighed by the increased cost of application in rough country.

"Arsenical preparations are effective but costly, as the cost of material only may be as high as £10 per acre when used on old deep-rooted plants on heavily infested areas.

"Experiments now being carried out by the department at Bright appear, so far as they have gone, to demonstrate fairly conclusively the value of smother crops against this weed. Various grasses and clovers have been sown on heavily weed-infested land with a view to testing their efficacy in choking out St. John's wort. The best results so far have been obtained with Subterranean clover. This was sown on April 15th last year; the land received only one shallow ploughing, the old growth being first burnt off. An inspection of this plot on the 24th instant showed that, although the clover was again commencing to grow, the wort was not showing any signs of recovery, and judging from present appearances, it appears that this clover may be successful in destroying St. John's wort.

"Some of the grasses, especially Hard Fescue, Kentucky Blue, Cocksfoot, and *Paspalum dilatatum*, promise well, and should ultimately give as good results as the clover, but owing to their slowness in establishing themselves, it is too soon yet to form a definite opinion as to their merits for the purpose.

"The sowing of Subterranean clover was very heavy, viz., at the rate of 20lbs. to the acre; this heavy sowing was rendered necessary on account of the poor cultivation, as it was deemed inadvisable in these tests to knock the weed about any more than could possibly be helped, and further, that on account of the great prevalence of seed-eating birds (finches) in the locality, heavy sowings were necessary. In these tests no manures of any kind were used."



## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on April 1st, 1921:—

**BUTTER.**—The more favorable weather conditions were responsible for better quality cream and butter coming forward, so that the shortage was not so acute. Still, top grades have not been equal to local requirements, and importations have been coming along from the neighboring States. Fair quantities of second-grade factory butters continue to come along, which were placed in cold store on account of the Imperial Government contract, which terminated on March 31st. The trade held a meeting to discuss the advisability of going into the Australian winter pool, but as South Australia has no surplus of first grades it was decided that we would not enter into the pool, so that our market is at the present time a free one. First-grade butters will be in active demand, but second and third grades will have little call, so that producers must exercise every care and send on first-quality cream, for second grades will be difficult to sell at something like 6d. or 7d. per lb. under top. At the close of the month factory and creamery in prints was 2s. 5d. to 2s. 6½d.; best separators and dairies, 2s. 3d. to 2s. 5d.; fair quality, 2s. 1d. to 2s. 2d.; well-conditioned store and collectors', 1s. 7d. to 1s. 8d.; weather-affected lots, 1s. 6d. to 1s. 7d.

**EGGS.**—Owing to better quality coming forward this has attracted export orders and the market has firmed considerably, at the close of the month fresh hen selling at 1s. 8d.; duck, 1s. 9d.

**CHEESE.**—Local and Western Australian trade has been most extensive, and the market at moment is rather bare of stocks. Present prices are from 12d. to 12½d. for large to loaf.

**HONEY.**—Values have eased, and this has had the effect of better inquiry, good sales being effected at the reduced price, prime clear extracted selling at 4½d.; second grades slow of sale at 3d.; beeswax saleable at 2s.

**ALMONDS.**—Quantities coming forward are not equal to local requirements, all consignments meeting with ready quitance, Brandis selling at 10d. per lb.; mixed softshells, 9d. per lb.; hardshells, 4½d. per lb.; kernels up to 1s. 7d. per lb.

**BACON.**—Values throughout the month have been stationary, but hams were easier. A fair demand has ruled for local and export. Best factory-cured sides, 1s. 6d. to 1s. 6½d.; middles, 1s. 7d. to 1s. 7½d.; hams, 1s. 7d. to 1s. 8d.

**LIVE POULTRY.**—Supplies have kept up remarkably well, and catalogues were quite in keeping with Easter supplies. It is pleasing to report that the demand has been excellent, and each market was nicely cleared. Where quality was right, very satisfactory prices ruled. Values are:—Prime table roosters, 5s. 6d. to 8s. 6d. each; nice conditioned cockerels, 4s. to 5s. 3d. each; plump hens, 4s. to 5s. 8d. each; light birds, 3s. to 3s. 9d. each; ducks, 3s. to 5s. 6d. each; geese, 4s. to 5s. 6d. each; turkeys, 1s. to 1s. 6d. per lb. live weight for prime conditioned, fair quality 10d. to 11½d. per lb., fattening sorts lower; pigeons, 7½d.

**POTATOES.**—Best Victorian Carmens, 10s. 6d. per cwt.; Millicent Redskins, 9s. per cwt. **ONIONS,** 7s. per cwt.

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Two things are necessary in order to give the greatest return from your Flocks:—

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**A. W. SANDFORD & Co., Ltd.,**  
GRENFELL STREET.

## THE AGRICULTURAL OUTLOOK.

### REPORT FOR THE MONTH OF MARCH.

The following report on the general agricultural condition and outlook of the area represented by the Government Experimental Farm mentioned below has been prepared by the manager:—

*Eyre Peninsula Farm.*—Weather—Have had an amount of thundery weather, it having rained on five days of the month, with a total of 317 points. Keeping remarkably cool at times, and is anything but good weather for this time of the year. Crops—All cereals harvested. Lucerne doing splendidly, also orchard and plantations. Castor oil beans making fine growth. Most stubbles have been burned. Natural Feed—Abundant and very green, the season suiting it. Stock—All in excellent condition and free from disease. Pests—Have not been hindered with any to any extent; rabbits beginning to put in an appearance.

### OUTLOOK FOR THE LAMB AND MUTTON MARKET.

The General Manager of the Government Produce Department (Mr. G. A. W. Pope), in commenting on the outlook from the producers' point of view regarding the lamb and mutton market, states:—"The present wholesale price for lamb and mutton in the London market is: Australian lamb 12½d., and Australian mutton 8d. per lb., and the consumption is such that all supplies are promptly used up in fair time after arrival. The Australian prices from now until the new season's lambs are ready are very favorable, and I consider that exporters will be very ready to take all the surplus that we may have this spring, at prices quite favorable to growers. It must, however, be understood that the very high rates that have ruled in the immediate past cannot be maintained, but good lambs should be worth £1 per head in Adelaide for export. The mutton position is not quite as good, although there will always be a demand at prices about similar to what they were in 1914, or, in other words, we must recede to pre-war conditions. When Europe rights itself financially, there is every prospect of the establishment of a frozen meat trade with the Continent, and the world's consumption will easily take the world's production. Growers are strongly advised to keep on producing lambs of export quality."

# **CALF AND PIG FEEDING**

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(REGISTERED).

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**DALGETY AND COMPANY, LIMITED**  
ADELAIDE AND BRANCHES.

## EGG-LAYING COMPETITION, 1920-1921.

HELD AT THE PARAFIELD POULTRY STATION, PARAFIELD, UNDER THE DIRECTION  
OF D. F. LAURIE (GOVERNMENT POULTRY EXPERT AND LECTURER).

[A TWELVE MONTHS' TEST STARTED ON APRIL 1ST, 1920, AND TO TERMINATE MARCH 31ST, 1921]

## SECTION 1.—LIGHT BREEDS (SINGLE TESTING). THREE PULLETS IN EACH ENTRY.

Row No.	Name and Address.	Bird No.	Month ending 31/3/21.	Final Scores.	Bird No.	Month ending 31/3/21.	Final Scores.	Bird No.	Month ending 31/3/21.	Final Scores.
WHITE LEGHORNS.										
A	Bertelsmeier, C. B., Kensington ..	1	15	165	2	23	164	3	14	Dead
A	McDonnell, G., Auburn, Melbourne	4	6	142	5	17	169	6	22	Dead
A	Stacey, R. S., Hamley Bridge ...	7	10	111	8	5	66	9	22	Dead
A	Ryan, J., Silvan, Victoria .....	10	3	148	11	22	191	12	16	Dead
A	Moritz Bros., Kalangadoo .....	13	21	214	14	—	Dead	15	21	Dead
A	Brown, J. P., Ballarat, Victoria ..	16	15	128	17	—	66	18	16	Dead
A	Rogers, A. H., Richmond, S.A. .	19	17	125	20	—	Dead	21	18	Dead
A	Eckermann, W. P., Eudunda ...	22	16	159	23	18	149	24	5	Dead
A	Burton, C. J., Mallala .....	25	—	—	26	—	—	27	—	Dead
A	Beythien, E. W., Scott's Creek ..	28	—	89	29	9	94	30	15	Dead
A	Moritz Bros., Kalangadoo .....	31	20	164	32	12	167	33	21	Dead
A	James, H. B., Kew, Victoria ....	34	6	117	35	1	109	36	20	Dead
A	Monkhouse, A. J., Woodside ....	37	13	133	38	19	168	39	12	Dead
A	Crear, H. S., Broken Hill .....	40	—	—	41	17	170	42	16	Dead
A	Roantree, W., Broken Hill .....	43	—	—	44	—	—	45	20	Dead
A	Beythien, E. W., Scott's Creek ..	46	15	145	47	—	—	48	—	Dead
A	Hocking, E. D., Kadina South ..	49	—	—	50	19	142	51	22	Dead
A	Raymoor Poultry Farm, Kilkenny	52	16	120	53	20	149	54	—	Dead
A	Keegan, H. V., Wallaroo .....	55	—	—	56	2	110	57	—	Dead
A	Lampert, Mrs. S., Piccadilly .....	58	20	147	59	17	165	60	19	Dead
A	Parsons, E. H., Pinnaroo .....	61	25	183	62	1	81	63	9	Dead
A	Raymoor Poultry Farm, Kilkenny	64	9	164	65	19	184	66	19	Dead
B	Stevens, H. J., Broken Hill .....	1	20	170	2	22	173	3	20	Dead
B	Glenelg River Poultry Farm, Mt. Gambier	4	21	211	5	16	206	6	18	Dead
B	Willington, Mrs. G., Milang .....	7	20	161	8	6	118	9	19	Dead
B	Rutledge, M., Broken Hill .....	10	18	179	11	—	—	12	15	Dead
B	Vercoe, Wm., Bayswater, Victoria	13	18	164	14	23	198	15	—	Dead
B	Stockman, A., Goodwood .....	16	20	173	17	7	142	18	20	Dead
B	Ritter, Wm., Magill .....	19	17	165	20	2	140	21	17	Dead
B	Blake, Mrs. M., Berowra, N.S.W.	22	22	179	23	22	177	24	14	Dead
B	Stidston, M., Cheltenham .....	25	3	139	26	22	205	27	17	Dead
B	Bamford, W. H., Glenelg .....	28	20	181	29	21	219	30	18	Dead
B	Windyridge Poultry Farm, Blackwood	31	19	182	32	21	173	33	13	Dead
B	Howie, H. H., Mount Gambier ..	34	20	184	35	22	184	36	22	Dead
B	Green, A. J., Crystal Brook ....	37	20	195	38	24	235	39	14	Dead
B	Green, F. W. H., Monteith .....	40	24	216	41	20	192	42	12	Dead
B	Rivett, J., Lockleys .....	43	—	—	44	—	—	45	—	Dead
B	Small, E. W., Mount Gambier ..	46	18	148	47	15	142	48	20	Dead
B	Herbert, C., Alberton .....	49	23	177	50	21	164	51	26	Dead
B	Holmes, F. A., Naracoorte .....	52	24	164	53	20	154	54	20	Dead

\* Failed under Regulation 13.

EGG-LAYING COMPETITION—continued

Name and Address.	Bird No.	Month ending 31/3/21.	Final Score.	Bird No.	Month ending 31/3/21.	Final Score.	Bird No.	Month ending 31/3/21.	Final Score.
WHITE LEGHORNS—continued.									
Ireen, F. W. H., Monteith .....	55	15	139	56	21	198	57	20	201
Herbert, C. Alberton .....	58		Dead	59	20	143	60	23	149
John, A. P., Balaklava .....	61	18	175	62	7	134	63	10	137
Thris, W., Glanville Blocks .....	64	17	144	65	8	151	66	12	126
Ireen, F. W. H., Monteith .....	1	20	165	2	17	171	3	20	173
Kolmes, F. A., Naracoorte .....	4	14	148	5	16	145	6		Dead
Lisle, Mrs. J., Glen Osmond .....	7	18	151	8	9	154	9	20	137
Man, H. J., jun., Angaston .....	10	16	138	11	22	150	12	7	120
Melman, A. C., Grange .....	13	6	114	14	21	193	15		Dead
Ireen, F. W. H., Monteith .....	16	20	207	17	24	208	18	22	190
Anderson, J., Prospect .....	19	*	*	20	*	*	21	6	88
Lisle, Mrs. J., Glen Osmond .....	22	*	*	23	21	143	24	—	126
TWO WHITE LEGHORNS, ONE ANCONA.									
Water, Geo. P., Naracoorte .....	25	20	156	26	13	197	27	14	144
		718	6,979			704	7,153		
								724	6,979

CON 2.—HEAVY BREEDS (SINGLE TESTING). THREE PULLETS IN EACH ENTRY

### BLACK ORPINGTONS.

Person	28	11	98	29	20	128	30	14	110
Wason, E. A., Camberwell, Victoria									
Bertelsmeier, C. B., Kensington	31	Dead		32	15	155	33	26	187
Law, R. R., Crystal Brook	34	15	161	35	11	125	36	14	127
Arman, T. E., Epping, N.S.W.	37	*	*	38	*	*	39	15	117
Loge, R. J., Morphet Vale	40	21	145	41	17	139	42	*	*
Law, R. R., Crystal Brook	43	19	167	44	15	108	45	—	65
James, F. A., Naracoorte	46	1	83	47	6	97	48	10	123
Buttfield, C. C., Crystal Brook	49	12	130	50	Dead		51	17	147
Thrill, W. A., Beaumaris, Victoria	52	15	121	53	*	*	54	13	92
Schermann, W. P., Eudunda	55	*	*	56	18	159	57	20	126
Amper, Mrs. S., Piccadilly	58	26	136	59	19	119	60	*	*
Lawson, Mrs. B., Beaumont	61	16	153	62	17	187	63	15	163
Sieber, J. M., North Broken Hill	64	*	*	65	*	*	66	23	199
James, F. A., Naracoorte	1	13	184	2	Dead		3	15	179
Travis, W., Glanville Blocks	4	22	159	5	Dead		6	16	118
Bertelsmeier, C. B., Kensington	7	15	202	8	21	176	9	16	145
Oster, G. P., Naracoorte	10	15	133	11	10	96	12	23	171
Gums, A. G., Neale's Flat	13	Dead		14	13	118	15	13	118

### RHODE ISLAND REDS.

Lacey, R. S., Hamley Bridge . . . .	16	13	115	17	19	125	18	9	135
Lockman, A., Goodwood . . . . .	19	14	122	20	8	130	21	3	130

## RHODE ISLAND WHITES.

Wesmer, Mrs. B., Beaumont	22	12	122	23	*	*	24	25	183
		240	2,231		209	1,862		287	2,635

\* Failed under Regulation 12.

## SECTION 3.—LIGHT BREEDS (PEN TEST). SIX PULLETS IN EACH PEN.

Pen No.	Name and Address.	Breed.	Eggs Laid for Month Ending 31/3/21.	Total Eggs Laid from 1/4/20 to 31/3/21.
1	Hodges, F., Ballarat North, Victoria	White Leghorns .....	77	1,118
2	Bertelsmeier, C. B., Kensington .....	" .....	64	950
3	Beythien, E. W., Scott's Creek .....	" .....	77	839
4	McDonnell, G., Auburn, Victoria .....	" .....	60	937
5	Bertelsmeier, C. B., Kensington .....	" .....	28	823
6	Thompson, E. F., Franklin .....	" .....	76	904
7	Purvis, W., Glanville Blocks .....	" .....	54	895
8	Smith & Gwynne, Gawler South .....	" .....	25	702
9	Anderson, S., Gawler Railway .....	" .....	64	1,070
10	Eckermann, W. P., Eudunda .....	" .....	19	755
11	Beythien, E. W., Scott's Creek .....	" .....	64	747
12	George, R., New Queenstown .....	" .....	45	892
13	Deacon, J. R., Solomontown .....	" .....	51	861
14	Alford, Thos., Broken Hill .....	" .....	81	1,121
15	Evans, H. A., Richmond .....	" .....	—	—
16	Connor, D. C., Gawler .....	" .....	66	872
17	Raymoor Poultry Farm, Kilkenny Blocks .....	" .....	95	1,117
18	Lampert, Mrs. S., Piccadilly .....	" .....	12	635
19	Pool, F. J., North Norwood .....	" .....	43	764
20	Woodhead, N., Torrensville .....	" .....	82	832
21	Thompson, E. F., Franklin .....	" .....	76	774
22	Randall, J., Bowden .....	" .....	43	560
23	Earle, E., Solomontown .....	" .....	—	—
24	Willington, Mrs. G., Milang .....	" .....	51	822
25	Vercoe, Wm., Sefton Park .....	" .....	96	1,101
26	Pugsley, A., Hindmarsh .....	" .....	37	601
27	Howie, H. H., Mount Gambier .....	" .....	24	808
28	Purvis, W., Glanville Blocks .....	" .....	47	810
29	Anderson, W., Kapunda .....	" .....	43	684
30	Broderick, P. J., Burra .....	" .....	—	—
31	Eldridge, J. H., Norwood .....	" .....	54	873
32	Pope Bros. & Co., Hectorville .....	" .....	50	742
33	Oakey, E., Mannahill .....	Brown Leghorns .....	60	748
			1,664	25,357

## SECTION 4.—HEAVY BREEDS (PEN TEST). SIX PULLETS EACH ENTRY.

34	Hogg, R. J., Morphet Vale .....	Black Orpingtons .....	—	—
35	Bertelsmeier, C. B., Kensington .....	" .....	—	—
36	Eckermann, W. P., Eudunda .....	" .....	80	805
37	Lampert, Mrs. S., Piccadilly .....	" .....	67	755
38	Bertelsmeier, C. B., Kensington .....	" .....	73	711
39	Bansemmer, Mrs. B., Beaumont .....	" .....	93	749
40	Purvis, W., Glanville Blocks .....	" .....	—	—
41	Siebler, J. M., North Broken Hill .....	" .....	—	—
42	Bertelsmeier, C. J., Kensington .....	" .....	—	—
43	Purvis, W., Glanville Blocks .....	" .....	—	—
44	Frost, F. W., Wallaroo .....	Barred Rocks .....	75	609
45	Lampert, Mrs. S., Piccadilly .....	Black Orpingtons .....	68	1,044
			456	4,664

\* Failed under Regulation 12.

## THE LAYING COMPETITION AT PARAFIELD, 1921-22.

COMMENTS BY THE GOVERNMENT POULTRY EXPERT.

### CONDITION AND APPEARANCE OF THE BIRDS.

The 1921-22 Test began on March 1st and will continue until end of February, 1922.

*Entries.*—Although entries are fewer than in previous years, it is gratifying to state that on the whole the birds are much more promising than those last year, particularly. A few pens are immature, but, providing they do not moult, will no doubt render a good account of themselves.

It is better to find less entries with better quality. Some years ago large entries were received, but quite a large percentage of the birds had no chance to put up a good score, as they were indifferent specimens. Most of the competitors are breeders of commercial poultry, and this is the class worthy of encouragement.

Some breeders who might have been expected to compete did not enter. The fact that a large number of entries failed to qualify in respect to weight of egg last year may have had a chastening effect.

*Type.*—Every year it is noticed that some pens contain birds varying in type. Evidently some breeders have no faith in their powers as breeders of laying poultry, and so send various types in the blind hope of hitting the mark—a good score. As will be seen, some of the birds are very small. The day of the undersized runt is at an end. The demand is for birds of good size and conforming to the characteristics of the breed. In Black Orpingtons the type and size are better; some of the birds are fine specimens. The undersized black fowl masquerading as a Black Orpington is out of date.

Some of the birds were in light condition—evidence of poor feeding. To succeed in the poultry business the birds must be liberally fed and kept in good growth from hatching until maturity. Good laying pullets should be well fleshed and firm; they should handle well and show plenty of life. Last year a lot of the birds handled badly, and were fragile in appearance.

*Vermin.*—Most of the birds sent in were free of vermin, and had been well dusted with insect powder. Others were in a less satisfactory condition. Vermin-infested poultry cannot be expected to thrive.

Many of the pens have made a good start, and it is hoped the egg yield will be satisfactory.



*Test commenced March 1st, 1921; Terminates February 28th, 1922.*

# REMARKS ON COMPETING BIRDS.

## SECTION 1.—SINGLE TESTING.—LIGHT BREEDS.

Bird No.	Remarks.	Weight of Bird.		Bird No.	Remarks.	Weight of Bird
		lbs.	ozs.			
E 1 ..	Small type .....	2	11	E38 ..	Small size, medium type, 2	2
E 2 ..	Small type, backward .....	2	7		promising layer	
E 3 ..	Small type .....	2	14	E39 ..	Small size, medium type, 2	2
E 4 ..	Medium type .....	2	12		promising layer	
E 5 ..	Fair bird .....	3	1	E40 ..	Backward, but promising; 3	3
E 6 ..	Medium type .....	2	13		good size	
E 7 ..	Good bird, good type, promising	3	1	E41 ..	Backward .....	2
E 8 ..	Good bird, good type, promising	3	5	E42 ..	Backward .....	2
E 9 ..	Good bird, good type, promising	3	3	E43 ..	Good type .....	3
E10 ..	Medium type .....	3	5	E44 ..	Good type .....	3
E11 ..	Medium type .....	3	7	E45 ..	Good type, but backward ..	3
E12 ..	Medium type .....	3	8	E46 ..	Good bird .....	3
E13 ..	Good type, promising .....	2	10	E47 ..	Good bird, slightly small ..	3
E14 ..	Good type, promising .....	2	10	E48 ..	Good bird .....	3
E15 ..	On small side, but backward ..	2	8	E49 ..	Only medium, round-eyed	3
E16 ..	Good type .....	3	4		type	
E17 ..	Backward, moulting .....	2	11	E50 ..	Only medium, round-eyed	2
E18 ..	Backward, poor type .....	2	11		type	
E19 ..	Good size, good type, promising	3	12	E51 ..	Good type, promising .....	2
E20 ..	Medium size, good type, promising	2	15	E52 ..	Very backward .....	2
E21 ..	Medium size, good type, promising	2	14	E53 ..	Very backward .....	2
E22 ..	Fair type .....	3	0	E54 ..	Very backward .....	2
E23 ..	Fair type .....	3	6	E55 ..	Good size, very fair, promising	3
E24 ..	Good typical White Leghorn ..	2	11		layer	
E25 ..	Fair type .....	3	1	E56 ..	Good size, very fair, promising	3
E26 ..	Backward, looks like moulting ..	2	13		layer	
E27 ..	Backward .....	3	0	E57 ..	Good size, very fair, promising	3
E28 ..	Fair type .....	3	13		layer	
E29 ..	Indifferent type, poor head, moulting	2	13	E58 ..	Medium size, likely layer ....	2
E30 ..	Fair type .....	3	14	E59 ..	Good type, good size .....	3
E31 ..	Small and backward .....	2	10	E60 ..	Medium size, likely layer ....	2
E32 ..	Fair type, good back .....	2	14	E61 ..	Fair type, very backward ....	2
E33 ..	Small and backward .....	2	9	E62 ..	Not likely looking, moulting ..	2
E34 ..	Fair type, on small side .....	2	14	E63 ..	Fair type, very backward ....	2
E35 ..	Fair type, on small side .....	2	9	E64 ..	Small, no type .....	2
E36 ..	Fair type, on small side .....	2	8	E65 ..	Slightly better type, backward	2
E37 ..	Small size, medium type, promising layer	2	11		ward	
				E66 ..	Only fair .....	2

## SECTION 2.—SINGLE TESTING.—HEAVY BIRDS.

F 7 ..	Fine big pullet, first class type	5	1	F11 ..	Good size, nice looking bird ..	4
F 8 ..	Good pullet, but smaller ....	4	2	F12 ..	Good size, fair type .....	3
F 9 ..	Good type Orpington; these three pullets are full of quality	4	7	F13 ..	Rather light in type .....	4
F10 ..	Good size, fair type .....	4	5	F14 ..	Rather light in type .....	4
				F15 ..	Fair type .....	5

## SECTION 2.—SINGLE TESTING.—HEAVY BIRDS—continued.

rd No.	Remarks.	Weight of Bird.		Bird No.	Remarks.	Weight of Bird.	
		lbs.	ozs.			lbs.	ozs.
6..	Only fair, not characteristic B.O.	4	4	F33 ..	Only medium size and type .	3	10
7..	Only fair, not characteristic B.O.	4	2	F34 ..	Medium size, only fair type ..	4	3
8..	Only fair, not characteristic B.O.	3	10	F35 ..	Medium size, only fair type ..	4	1
9..	Good type pullet .....	4	12	F36 ..	Medium size, only fair type ..	4	11
10..	Good type, but smaller .....	4	4	E37 ..	Only medium size, do not con- form to type	4	4
11..	Good quality and promising ..	4	11	F38 ..	Only medium size, do not con- form to type	4	2
12..	Very backward .....	3	12	F39 ..	Only medium size, do not con- form to type	3	10
13..	Very backward .....	4	3	F40 ..	Small size, poor type, lot black in plumage	4	2
14..	Very backward .....	3	10	F41 ..	Fair type, slightly backward .	4	3
15..	Good type and size .....	4	9	F42 ..	Fair type, slightly backward .	3	14
16..	Backward .....	3	12	F43 ..	Very backward, no type or color	2	12
17..	Backward .....	3	14	F44 ..	Very backward, no type or color	2	4
18..	Good size, fair type .....	5	4	F45 ..	Very backward, no type or color	3	5
19..	Medium type and size .....	5	7				
20..	Good size, coarse-headed .....	5	12				
21..	Only medium size and type .	4	4				
22..	Only medium size and type .	3	10				

## SECTION 3.—PEN TEST.—LIGHT BREEDS (SIX PULLETS EACH PEN.)

Pen	Remarks.	lbs.		Pen	Remarks.	lbs.	
		3	6			3	1
1..	Medium size, fair type, im- provement in size	4	0	6..	Medium size, all fantailed, likely layers	3	5
		2	8			3	0
		2	13			3	3
		2	11			3	6
		3	0			2	14
2..	Five fair type, one very small	3	2	7..	No distinctive type, two backward birds	2	11
		3	5			2	15
		2	10			3	5
		2	12			2	13
		2	15			2	11
		3	0			2	9
3..	Four good pullets, one lack- ing in type, one on small side, general good size	2	15	8..	Fair lot, all on small side, very quiet	3	13
		3	10			3	4
		3	4			2	13
		3	11			3	5
		3	1			3	7
		3	8			3	0
4..	Good close-feathered type, high tails	3	1	9..	Medium size, inclined coarse headed; no two birds same type	3	14
		3	4			2	13
		3	9			3	1
		2	14			2	12
		3	5			3	6
		3	3			3	5
5..	Fine large birds, correct type	3	5	10..	Two good pullets, two medium pullets, two poor type; bad heads	2	13
		3	9			2	13
		2	12			3	0
		3	3			2	6
		3	6			2	11
		3	8			2	4

SECTION 3.—PEN TEST.—LIGHT BREEDS (SIX PULLETS EACH PEN)—*continued.*

	lbs.	ozs.		lbs.
Pen 11.. One fair size and type, rest small to medium; nothing striking	2	10	Pen 18.. Fair lot, good fine heads, big eaters	3
	2	8		2
	2	5		2
	2	9		3
	2	12		2
	2	15		3
Pen 12.. Three medium size, three small ones, close-feathered	3	0	Pen 19.. Four very backward, no distinctive type	1
	2	1		2
	2	14		2
	3	2		2
	2	15		2
	3	6	Pen 20.. Very fair pen, one on small side, good eaters	2
Pen 13.. Six medium size, close-feathered, lacking type	3	3		3
	3	2		3
	2	14		3
	3	3		3
	3	1	Pen 21.. Hard-feathered, two poor in type	3
	3	2		3
Pen 14.. Four fair pullets and good type, one small pullet, one medium pullet	3	0		3
	3	1		3
	2	14		3
	3	2	Pen 22.. Six good-bodied birds, fair type, likely layers, one inclined to be coarse-headed	3
	2	15		3
	3	6		3
Pen 15.. Good type, good shoulders, close-feathered, likely layers	4	0		3
	3	8	Pen 23.. Six fair type, good medium birds	3
	3	8		3
	3	3		3
	3	5		2
	3	4		4
Pen 16.. Mixed type, one good pullet two coarse in head	3	8		3
	2	11	Pen 24.. Good medium type, fair size, promising	3
	3	1		4
	2	12		3
	2	14		3
	3	5		3
Pen 17.. Very backward, probably improve	2	1	Pen 25.. Good size and general type, one coarse in head, slight tendency in others	3
	2	4		3
	1	14		3
	2	5		3
	2	4		3
	2	2		3

## SECTION 4.—PEN TEST.—HEAVY BREEDS (SIX PULLETS EACH PEN.)

	lbs.	ozs.		lbs.
Pen 26.. Six first class type, good size, good color, likely layers	5	0	Pen 27.. One small, fair type, three good size, two medium size	4
	5	0		4
	5	4		4
	4	12		5
	5	8		4
	6	0		

## SECTION 4.—PEN TEST.—HEAVY BREEDS (SIX FULLETS EACH PEN)—continued.

	lbs.	ozs.		lbs.	ozs.
Pen 29.. Six medium type .....	4	8	Pen 32.. New type, showing strong,	4	2
	4	8	Langshan character	4	3
	4	12	about head, medium size	4	8
	4	12		4	0
	3	8		4	2
	4	4		4	0
Pen 30.. Three fine big birds, three	5	0	Pen 33.. Nice size, thoroughly well-	4	10
medium size	4	7	developed pen, type to	4	11
	4	0	be recommended	5	0
	4	10		5	0
	4	11		5	0
	4	6		5	4
Pen 31.. Very backward, not likely	2	12	Pen 34.. Laying strain, do not con-	4	2
to attain size	3	8	form to type, color vary-	3	4
	3	2	ing from mealy to black	3	10
	3	10	feathered	4	8
	3	6		3	9
	3	9		4	0

## A BUTTER OF GOOD KEEPING QUALITIES.

In order to make butter which will keep for any length of time, says the Dairy Expert (Mr. P. H. Suter), it is necessary that good-conditioned cream be used—probably the latter end of spring months would be the most suitable time, by reason of the fact that the weather conditions are good, the possibility of weedy flavor is lessened, and the body is generally better. The cream should be ripened uniformly, and not allowed to become too sour. In making butter, churn at such temperatures that a good firm grain is obtained, and observe that the final washing runs away clear, and not in any way cloudy. Salt a little heavier, say, 4lbs. of salt and  $\frac{1}{2}$ lb. of preservative to each 100lbs. of butter; pack well into earthenware jars, and place on top of the butter a brine several inches deep of a strength of 2lbs. of salt to 1gall. of boiled water, which has been cooled. Of course, to ensure the keeping qualities, it would be necessary to pasteurise the cream; but under ordinary farm conditions this is hardly practicable, on account of the necessity of acquiring knowledge regarding acidity (sourness) of cream and the propagation of cultures.

## EGG-LAYING COMPETITION, 1921-1922.

HELD AT THE PARAFIELD POULTRY STATION, PARAFIELD, UNDER THE DIRECTION  
OF D. F. LAURIE (GOVERNMENT POULTRY EXPERT AND LECTURER).

Total No. of Pens.—Section I, Light Breeds (Single Testing), 24—3 pullets in each entry. &  
IL Heavy Breeds (Single Testing), 13—3 pullets in each entry. Section III, Light Breeds,  
pullets in each pen. Section IV., Heavy Breeds, 9—6 pullets in each pen.

TWELVE MONTHS' TEST. TO START ON MARCH 1st, 1921, AND TO TERMINATE ON FEBRUARY 28th, 1922.

## SECTION I.—LIGHT BREEDS (SINGLE TESTING). THREE PULLETS IN EACH ENTRY.

Row No.	Name and Address.	Bird No.	Month ending 31/3/21.	Score to Date.	Bird No.	Month ending 31/3/21.	Score to Date.	Bird No.	Month ending 31/3/21.
WHITE LEGHORNS.									
E	Bamford, W. H., 74, Adelaide Road, Glenelg	1	3	3	2	2	2	3	19
E	Connor, D. C., Gawler	4	15	15	5	5	5	6	18
E	Willington, Mrs. G., Milang	7	19	19	8	8	8	9	12
E	Nancarrow, J. T., Plympton	10	4	4	11	9	9	12	12
E	Broadview Poultry Farm, Seaton Park	13	19	19	14	10	10	15	8
E	Stevens, H. J., Broken Hill	16	13	13	17	—	—	18	—
E	Monkhouse, A. J., Woodside	19	12	12	20	12	12	21	15
E	Turvey, D. J., Milang	22	1	1	23	—	—	24	—
E	Lampert, Mrs. S., Piccadilly	25	1	1	26	—	—	27	—
E	Nancarrow, J. T., Plympton	28	18	18	29	—	—	30	14
E	Small, E. W., Mount Gambier	31	—	—	32	—	—	33	—
E	Coleman, A. C., Grange	34	—	—	35	—	—	36	—
E	Broadview Poultry Farm, Seaton Park	37	4	4	38	16	16	39	15
E	Holmes, F. A., Naracoorte	40	—	—	41	—	—	42	—
E	Lampert, Mrs. S., Piccadilly	43	18	18	44	7	7	45	15
E	Green, F. W. H., Monteith	46	6	6	47	13	13	48	10
E	Howie, H. H., Mount Gambier	49	—	—	50	8	8	51	—
E	Willmott, H. J., Clarence Park	52	—	—	53	—	—	54	1
E	Stockman, A., Goodwood	55	11	11	56	1	1	57	8
E	Green, A. J., Crystal Brook	58	7	7	59	3	3	60	4
E	Herbert, C., Alberton	61	—	—	62	—	—	63	—
E	Blake, Mrs. B. L., Berowra, N.S.W.	64	6	6	65	11	11	66	—
F	Tilly, P. N., Balwyn, Victoria	1	—	—	2	11	11	3	1
F	Dugan, T., Wingfield Rifle Range, Port Adelaide	4	7	7	5	—	—	6	13
	Total	—	164	164	—	116	116	—	165

## SECTION 2.—HEAVY BREED (SINGLE TESTING). THREE PULLETS EACH ENTRY.

## BLACK ORPINGTONS.

F	Lampert, Mrs. S., Piccadilly	7	21	21	8	12	12	9	12
F	Shaw, R. R., Crystal Brook	10	1	1	11	—	—	12	—
F	Farr, K. H., Fullarton Estate	13	26	26	14	24	24	15	25
F	Alford, T., Broken Hill	16	26	26	17	25	25	18	28
F	Lampert, Mrs. S., Piccadilly	19	—	—	20	19	19	21	—
F	Holmes, F. A., Naracoorte	22	—	—	23	—	—	24	—
F	Shaw, R. R., Crystal Brook	25	—	—	26	—	—	27	—
F	Wheaton, S. P., Bute	28	22	22	29	13	13	30	7
F	Bansemmer, Mrs. B., Beaumont	31	25	25	32	24	24	33	—
F	Farr, K. H., Fullarton Estate	34	24	24	35	15	15	36	23
F	Mortimer, G., Broken Hill	37	25	25	38	21	21	39	—

Name and Address.	Bird No.	Month ending 31/3/21.	Score to Date.	Bird No.	Month ending 31/3/21.	Score to Date.	Bird No.	Month ending 31/3/21.	Score to Date.
RHODE ISLAND REDS.									
Stockman, A., Goodwood .....	40	6	6	41	7	7	42	—	—
Tester, G., Naracoorte .....	43	—	—	44	—	—	45	—	—
Total .....	—	178	178	—	160	160	—	95	95

## SECTION 3.—LIGHT BREEDS (PEN TESTS). SIX PULLETS IN EACH PEN.

Pen No.	Name and Address.	Breed.	Eggs Laid for Month Ending 31/3/21.	Total Eggs Laid from 1/3/21 to 31/3/21.
1	Anderson, S., Gawler Railway .....	White Leghorns .....	80	80
2	Pugsley, A., Hindmarsh .....	" .....	103	103
3	Connor, D. C., Gawler .....	" .....	78	78
4	Wilmington, Mrs. G., Milang .....	" .....	94	94
5	Norton Bros., Seaton Park .....	" .....	79	79
6	Nancarrow, J. T., Plympton .....	" .....	29	29
7	Small, E. W., Mount Gambier .....	" .....	21	21
8	Buchan, J. S., Seaton Park .....	" .....	105	105
9	Anderson, J., Prospect .....	" .....	57	57
10	Pugsley, A., Hindmarsh .....	" .....	74	74
11	Alford, T., Broken Hill .....	" .....	45	45
12	Pool, F. J., North Norwood .....	" .....	94	94
13	Nancarrow, J. T., Plympton .....	" .....	49	49
14	Smith & Gwynne, Gawler South .....	" .....	125	125
15	Ratten, C. A., Mile End .....	" .....	103	103
16	Howie, H. H., Mount Gambier .....	" .....	122	122
17	Willmott, H. J., Clarence Park .....	" .....	6	6
18	Anderson, Wm., Kapunda .....	" .....	121	121
19	Herbert, C., Alberton .....	" .....	25	25
20	Sparrow, F. H. L., Beverley .....	" .....	108	108
21	Clee Hill Stud Poultry Farm, Box Hill, Victoria .....	" .....	61	61
22	Beythein, E. W., Scott's Creek .....	" .....	68	68
23	Provis & Sons, W., Tumby Bay .....	" .....	73	73
24	Dugan, T., Wingfield Rifle Range, Port Adelaide .....	" .....	73	73
25	Bansemmer, Mrs. B., Beaumont .....	" .....	126	126
Total .....			1,919	1,919

## SECTION 4.—HEAVY BREEDS (PEN TEST). SIX PULLETS EACH ENTRY.

26	Lampert, Mrs. S., Piccadilly .....	Black Orpingtons .....	127	127
27	Farr, K. H., Fullarton Estate .....	" .....	63	63
28	Bansemmer, Mrs. B., Beaumont .....	" .....	—	—
29	Farr, K. H., Fullarton Estate .....	" .....	89	89
30	Lampert, Mrs. S., Piccadilly .....	" .....	138	138
31	Alford, T., Broken Hill .....	" .....	—	—
32	Clee Hill Stud Poultry Farm, Box Hill, Victoria .....	" .....	116	116
33	Lampert, Mrs. S., Piccadilly .....	" .....	123	123
34	Ryan, Jas., Colburg, Victoria .....	Rhode Island Reds ..	129	129
Total .....			785	785

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of March, 1921, and the average annual rainfall.

Station.	For March, 1921.	To end March, 1921.	A'ge. to end March.	A'ge. Annual Rainfall.	Station.	For March, 1921.	To end March, 1921.	A'ge. to end March.	A'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	0.74	2.48	1.85	4.73	Spalding .....	1.48	5.55	2.13	20.1
Marree .....	1.57	1.90	1.46	6.02	Gulnare .....	1.72	5.59	1.99	18.9
Farina .....	1.76	2.11	1.71	6.57	Yacka .....	1.11	4.92	1.70	15.2
Copley .....	2.52	3.20	1.91	8.30	Koolunga .....	1.41	5.88	1.90	15.7
Beltana .....	2.35	3.87	2.17	8.93	Snowtown .....	2.16	6.91	1.83	15.5
Blinman .....	3.13	4.77	2.58	12.52	Brinkworth .....	0.85	4.84	1.91	15.9
Tarcoola .....	1.58	9.00	1.49	7.33	Blyth .....	0.83	5.22	2.02	16.5
Hookina .....	5.11	8.85	1.68	12.65	Clare .....	1.01	5.64	2.72	24.4
Hawker .....	4.03	9.81	1.70	12.37	Mintaro .....	1.54	5.34	2.27	23.6
Wilson .....	4.48	9.28	1.74	11.85	Watervale .....	1.51	5.26	2.81	27.4
Gordon .....	5.76	12.57	1.98	10.43	Auburn .....	1.96	7.14	2.92	17.8
Quorn .....	5.79	12.68	1.78	13.79	Hoyleton .....	1.24	4.60	2.09	15.8
Port Augusta .....	5.63	11.25	1.71	9.42	Balaklava .....	0.99	4.71	2.00	13.1
Port Augusta West .....	5.29	10.44	1.43	9.36	Port Wakefield .....	2.94	6.63	2.15	13.5
Bruce .....	6.21	10.89	1.74	9.99	Terowie .....	4.31	7.89	2.11	13.9
Hammond .....	6.55	11.27	1.87	11.36	Yarcowie .....	3.88	7.79	2.16	13.5
Wilmington .....	7.95	13.96	2.12	18.06	Hallett .....	2.33	5.88	1.93	16.2
Willowie .....	3.88	8.11	1.87	11.82	Mount Bryan .....	1.80	6.10	1.93	16.3
Melrose .....	8.12	15.99	3.11	23.11	Burra .....	1.92	5.41	2.36	17.9
Booleroo Centre .....	5.40	9.95	1.98	15.51	Farrell's Flat .....	1.14	4.60	2.16	18.8
Port Germein .....	4.10	10.21	1.80	12.65	WEST OF MURRAY RANGE.				
Wirrabara .....	5.97	11.50	2.23	19.44	Manoora .....	1.51	5.51	2.02	18.5
Appila .....	4.73	7.81	1.57	14.90	Saddleworth .....	1.52	5.55	2.43	19.7
Cradock .....	5.51	10.50	1.70	10.82	Marrabel .....	2.18	6.64	2.14	19.4
Carrieton .....	6.49	11.57	1.87	12.34	Riverton .....	1.40	5.21	2.49	20.7
Johnburg .....	6.78	12.23	1.56	10.22	Tarlee .....	1.23	4.64	2.24	17.9
Eurelia .....	4.40	8.99	1.99	13.11	Stockport .....	1.35	6.66	2.10	16.9
Orroroo .....	5.21	12.51	2.24	13.42	Hamley Bridge .....	1.24	6.32	2.18	16.5
Nackara .....	6.35	10.59	2.07	10.63	Kapunda .....	2.21	5.87	2.57	19.8
Black Rock .....	4.16	11.67	2.01	12.29	Freeling .....	1.23	4.64	2.30	17.6
Uoolta .....	4.25	7.54	2.02	11.65	Greenock .....	1.73	5.94	2.45	21.7
Peterborough .....	4.25	7.45	2.16	13.82	Truro .....	4.37	8.76	2.34	20.1
Yongala .....	4.38	7.56	1.99	14.13	Stockwell .....	3.38	6.98	2.31	20.4
LOWER NORTH-EAST.					Nuriootpa .....	2.75	6.32	2.35	21.0
Yunta .....	4.35	8.53	1.85	8.40	Angaston .....	2.74	6.68	2.48	22.5
Waukaringa .....	3.10	6.27	1.63	8.15	Tanunda .....	1.77	5.14	2.58	22.3
Mannahill .....	5.39	11.97	1.75	8.51	Lyndoch .....	1.77	5.21	2.27	22.8
Cockburn .....	2.19	5.37	1.80	8.03	Williamstown .....	1.79	5.19	2.56	27.7
Broken Hill, N.S.W. ....	2.41	5.35	2.14	9.89	ADELAIDE PLAINS.				
LOWER NORTH.					Mallala .....	1.36	4.28	2.10	16.6
Port Pirie .....	3.76	8.36	1.86	13.26	Roseworthy .....	1.03	3.60	2.14	17.3
Port Broughton .....	1.33	6.36	1.73	14.13	Gawler .....	1.28	4.48	2.35	19.1
Bute .....	1.02	5.37	1.78	15.55	Two Wells .....	1.05	3.02	2.02	15.9
Laura .....	4.32	8.09	2.15	18.12	Virginia .....	1.22	3.58	2.18	17.1
Caltowie .....	4.33	8.61	2.14	17.02	Smithfield .....	1.09	3.24	2.24	17.3
Jamestown .....	4.32	7.78	2.10	17.56	Salisbury .....	1.27	3.29	2.42	18.2
Bundaleer W. Wks. ....	1.51	5.59	1.84	17.56	North Adelaide .....	2.04	4.52	2.41	21.67
Gladstone .....	3.50	7.60	1.92	18.05	Adelaide .....	1.65	3.79	2.41	21.01
Crystal Brook .....	2.66	8.25	1.86	15.62	Glenelg .....	1.41	3.17	2.30	18.42
Georgetown .....	2.32	6.04	2.20	18.30	Brighton .....	2.11	4.51	2.61	21.03
Narridy .....	1.77	5.49	1.99	16.43	Mitcham .....	1.90	4.03	2.50	23.66
Redhill .....	1.55	6.70	1.87	16.66	Glen Osmond .....	1.53	3.27	2.68	25.73
					Magill .....	1.56	3.53	2.85	25.38

## RAINFALL—continued.

Station.	For March, 1921.	To end March, 1921.	Av'ge. to end March.	Av'ge. Annual Rainfall
MOUNT LOFTY RANGES.				
Wetree Gully.....	1.69	3.88	3.05	27.73
Wetree West.....	3.07	5.54	4.44	46.82
Wetree.....	2.72	5.28	4.31	44.49
Wetree.....	2.73	5.82	3.47	33.18
Wetree Vale.....	2.03	4.27	2.63	22.90
Wetree.....	1.78	4.16	2.29	20.21
Wetree.....	2.25	4.54	2.74	25.82
Wetree.....	1.87	3.62	2.35	20.22
Wetree.....	2.83	5.07	—	—
Wetree.....	2.43	4.94	2.12	20.53
Wetree.....	2.35	4.91	2.54	22.93
Wetree.....	2.77	7.27	2.70	27.01
Wetree.....	2.59	6.33	2.90	29.43
Wetree.....	2.63	6.04	3.20	33.33
Wetree.....	2.42	5.28	—	—
Wetree.....	3.12	6.18	3.09	35.60
Wetree.....	3.59	6.19	3.07	32.05
Wetree.....	2.63	6.90	3.28	34.81
Wetree.....	3.00	5.59	3.21	28.58
Wetree.....	3.82	6.15	3.32	31.10
Wetree.....	2.96	5.21	3.40	32.94
Wetree.....	2.86	4.98	3.20	30.60
Wetree.....	2.88	4.59	3.71	36.26
Wetree.....	2.24	4.33	2.48	19.28
MURRAY FLATS AND VALLEY.				
Wetree.....	1.10	2.88	2.15	18.77
Wetree.....	1.18	3.16	2.06	15.56
Wetree.....	1.65	4.73	1.99	14.59
Wetree.....	2.08	4.67	2.18	14.82
Wetree.....	2.88	5.25	2.27	24.55
Wetree.....	3.08	6.24	2.06	13.98
Wetree.....	2.29	3.19	2.17	15.45
Wetree.....	3.32	5.85	1.85	11.51
Wetree.....	2.99	5.78	2.09	15.23
Wetree.....	3.65	6.76	1.76	12.07
Wetree.....	3.87	7.63	1.83	10.80
Wetree.....	1.98	4.46	1.84	10.26
Wetree.....	3.89	6.95	2.16	17.51
Wetree.....	2.90	4.95	1.48	10.90
Wetree.....	0.95	5.76	1.45	9.13
Wetree.....	1.42	6.91	1.65	9.41
Wetree.....	1.88	5.29	1.88	11.11
Wetree.....	1.24	4.65	2.65	12.27
Wetree.....	0.99	6.30	1.94	10.92
WEST OF SPENCER'S GULF.				
Wetree.....	0.24	0.35	2.11	10.03
Wetree.....	—	0.11	1.53	9.24
Wetree.....	0.50	1.33	1.39	12.11
Wetree.....	0.30	2.44	1.64	12.26
Wetree.....	0.36	2.85	1.29	10.47
Wetree.....	0.18	3.08	1.21	10.37
Wetree.....	0.50	3.40	1.36	12.97
Wetree.....	0.29	3.77	1.52	15.09
Wetree.....	1.52	3.90	1.16	15.35
Wetree.....	0.47	1.26	1.38	16.37
Wetree.....	0.55	2.46	—	—
Station.	For March, 1921.	To end March, 1921.	Av'ge. to end March.	Av'ge. Annual Rainfall
WEST OF SPENCER'S GULF—continued.				
Port Lincoln.....	0.49	1.86	1.96	19.83
Tumby.....	0.46	2.37	1.57	14.76
Carrow.....	1.38	3.91	1.91	15.14
Arno Bay.....	1.05	3.74	1.85	13.10
Cleve.....	2.94	7.71	—	11.56
Cowell.....	2.23	6.36	1.75	11.84
Point Lowly.....	3.50	9.34	1.90	—
YORKE PENINSULA.				
Walleroo.....	2.10	6.85	1.81	14.11
Kadina.....	2.81	7.36	1.84	15.93
Moonta.....	2.08	6.16	1.87	15.31
Green's Plains.....	1.56	5.20	1.68	15.73
Maitland.....	1.29	4.62	2.03	20.20
Ardrossan.....	3.95	5.92	1.67	13.96
Port Victoria.....	1.74	4.57	1.60	15.34
Curramulka.....	2.07	3.41	2.00	18.31
Minlaton.....	2.92	4.80	1.81	17.70
Brentwood.....	2.43	4.24	1.60	15.44
Stansbury.....	2.47	3.90	1.85	17.08
Warooka.....	2.25	4.03	1.64	17.74
Yorketown.....	2.28	4.05	1.68	17.29
Edithburgh.....	2.05	4.06	1.85	16.58
SOUTH AND SOUTH-EAST.				
Cape Borda.....	0.61	0.92	2.11	24.96
Kingscote.....	0.42	2.14	1.84	18.92
Penneshaw.....	0.40	2.41	2.38	21.39
Victor Harbor.....	1.68	3.94	2.48	21.58
Port Elliot.....	1.74	3.61	2.44	20.00
Goolwa.....	1.69	6.18	2.42	17.87
Karoonda.....	2.80	5.97	—	—
Mindarie.....	1.62	3.55	—	—
Meribah.....	1.01	2.37	—	—
Pinnaroo.....	4.71	8.95	2.35	15.57
Parilla.....	2.03	3.87	1.85	14.02
Lameroo.....	1.47	3.96	2.03	16.45
Parrakie.....	2.35	4.12	1.79	14.42
Geranium.....	1.63	3.46	2.02	16.24
Peake.....	2.63	7.72	2.32	16.25
Cooke's Plains.....	2.67	5.69	2.00	15.00
Coomandook.....	2.98	5.50	2.03	17.75
Coonalpyn.....	1.34	2.78	2.11	17.64
Tintinara.....	0.90	2.96	2.14	18.83
Keith.....	0.58	4.41	2.15	18.51
Bordertown.....	0.71	2.82	2.25	19.52
Wolseley.....	0.81	3.31	1.97	18.07
Frances.....	0.67	2.89	2.32	20.10
Naracoorte.....	0.58	4.05	2.53	22.53
Penola.....	1.00	2.50	3.15	26.48
Lucindale.....	1.06	2.62	2.34	22.93
Kingston.....	1.22	2.71	2.41	24.51
Robe.....	0.36	1.52	2.54	24.60
Beachport.....	0.66	1.87	3.00	27.29
Millicent.....	0.89	2.51	3.32	29.29
Kalangadoo.....	1.24	3.17	—	—
Mount Gambier.....	0.77	2.34	3.95	31.65



## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		April.	May.			April.	May.
Alawoona .....	•	—	—	Frances .....	•	30	28
Aldinga .....	•	—	—	Freeling .....	•	—	—
Amyton .....	•	—	—	Gawler River .....	•	25	23
Angaston .....	•	—	—	Georgetown .....	•	16	21
Appila-Yarrowie .....	•	22	—	Geranium .....	•	30	28
Artherton .....	•	—	—	Gladstone .....	•	16	21
Ashbourne .....	801-3	25	23	Glencoe .....	804	—	—
Balaklava .....	•	9	14	Glossop .....	797	—	—
Barmera .....	799	—	—	Goode .....	•	20	26
Beetaloo Valley .....	†	20	18	Green Patch .....	793-6	18	16
Belalie North .....	•	16	21	Gumeracha .....	•	26	22
Berri .....	800	20	26	Halidon .....	•	—	—
Big Swamp .....	796	—	—	Hartley .....	801	20	18
Blackheath .....	801-3	16	21	Hawker .....	•	19	24
Black Springs .....	788	—	—	Hilltown .....	•	—	—
Blackwood .....	803	18	16	Hookina .....	786	21	19
Blyth .....	•	23	21	Inman Valley .....	•	—	—
Booleroo Centre .....	•	22	20	Ironbank .....	•	16	21
Borrika .....	•	—	—	Julia .....	•	—	—
Bowhill .....	•	—	—	Kadina .....	•	—	—
Brentwood .....	•	21	19	Kalangadoo .....	•	9	14
Brinkley .....	•	16	21	Kanmantoo .....	•	16	21
Bundaleer Springs .....	788	—	—	Keith .....	•	—	—
Burra .....	•	—	—	Ki Ki .....	•	—	—
Bute .....	•	19	17	Kilkerran .....	792	22	19
Butler .....	•	25	—	Kimba .....	•	—	—
Caltowie .....	•	—	—	Kingscote .....	•	—	—
Canowie Belt .....	•	—	—	Kingston-on-Murray .....	•	—	—
Carrow .....	•	22	19	Kongorong .....	807	22	19
Cherry Gardens .....	803	19	17	Koonibba .....	•	22	19
Clanfield .....	•	—	—	Koppio .....	†	18	16
Clare .....	•	5	3	Kybybolite .....	•	21	19
Clarendon .....	•	18	16	Lake Wangary .....	•	16	21
Claypan Bore .....	•	20	36	Lameroo .....	†	—	—
Cleve .....	•	20	18	Laura .....	788-7	22	20
Collie .....	•	—	—	Leighton .....	•	—	—
Colton .....	•	—	—	Lenswood and Forest Range .....	•	16	14
Coomandook .....	•	20	27	Lone Gum .....	800	—	—
Coonalpyn .....	•	—	—	Lone Pine .....	791	—	—
Coonawarra .....	•	—	—	Longwood .....	804	—	—
Coorabie .....	•	—	—	Loxton .....	•	—	—
Cradock .....	•	—	—	Lucindale .....	806	—	—
Crystal Brook .....	•	16	21	Lyndoch .....	791	21	19
Cummins .....	•	23	21	MacGillivray .....	804	20	18
Cygnat River .....	803-4	21	19	Maitland .....	793	2	7
Dawson .....	•	—	—	Mallala .....	789	4	2
Denial Bay .....	•	—	—	Mangalo .....	•	—	—
Dowlingville .....	791-6	—	—	Wantung .....	•	—	—
Edillilie .....	796	30	28	Meadows .....	•	20	18
Elbow Hill .....	796	23	28	Meningie .....	•	—	—
Eurelia .....	•	—	—				

## INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		April.	May.			April.	May.
Meribah .....	†	20	18	Benmark .....	•	22	20
Milang .....	801	9	14	Riverton .....	•	—	—
Millicent .....	•	2	7	Riverton (Women's) .....	•	—	—
Miltalie .....	793-6	16	21	Roberts and Verran .....	794	18	16
Mindarie .....	•	4	2	Rosedale .....	791	—	—
Minlaton .....	•	22	20	Rosy Pine .....	†	20	18
Minnipa .....	•	—	—	Saddleworth .....	•	—	—
Mintaro .....	•	16	21	Saddleworth (Women's) .....	791	—	—
Monarto South .....	797	—	—	Salisbury .....	•	5	3
Moonta .....	793	22	20	Salt Creek .....	•	—	—
Moorak .....	807	—	—	Sandalwood .....	•	—	—
Moorlands .....	•	—	—	Sherlock .....	•	—	—
Moorook .....	•	—	—	Shoal Bay .....	•	—	—
Morchar .....	•	16	21	Smoky Bay .....	796	16	21
Morgan .....	•	—	—	Spalding .....	•	—	—
Morphett Vale .....	804	22	19	Stockport .....	•	—	—
Mount Barker .....	†	20	18	Strathalbyn .....	802	19	17
Mount Bryan .....	•	—	—	Talia .....	795	11	9
Mount Bryan East .....	•	—	—	Tantanoola .....	•	16	21
Mount Compass .....	•	—	—	Taplan .....	•	—	—
Mount Gambier .....	807	9	14	Taroowie .....	786	19	17
Mount Hope .....	•	16	21	Tatiara .....	•	16	21
Mount Pleasant .....	•	—	—	Two Wells .....	791	—	—
Mount Remarkable .....	•	—	—	Uraidla and Summert'n .....	•	4	2
Mundalla .....	•	20	18	Veitch .....	•	—	—
Mundoorra .....	†	25	23	Waikerie .....	•	—	—
Murray Bridge .....	•	—	—	Wall .....	•	—	—
Myponga .....	†	20	18	Wanbi .....	•	—	—
Nantawarra .....	•	21	19	Warowie .....	•	—	—
Naracoorte .....	•	9	14	Warrow .....	•	—	—
Narriby .....	•	9	14	Watervale .....	•	—	—
Narrung .....	•	23	21	Wepowie .....	•	16	21
Netherton .....	•	—	—	Whyte-Yarowie .....	•	—	—
North Booborowie .....	•	—	—	Wilkawatt .....	800	16	21
North Bundaleer .....	•	—	—	Williamstown (Women's) .....	791	4	1
Northfield .....	•	13	11	Williamstown .....	791	—	—
Nunkeri and Yargo .....	•	2	1	Willowie .....	786	20	18
O'Loughlin .....	•	20	18	Wilmington .....	•	20	18
Orroroo .....	•	—	—	Wirrabara .....	•	—	—
Parilla .....	•	—	—	Wirrega .....	•	—	—
Parilla Wall .....	•	25	23	Wolowa .....	•	—	—
Parrakia .....	•	—	—	Woodleigh .....	•	—	—
Paruna .....	•	—	—	Woodside .....	•	16	21
Paakeville .....	793	19	17	Wudinna .....	•	—	—
Penola .....	807	2	7	Wynarka .....	•	—	—
Penong .....	•	23	21	Yabmana .....	•	—	—
Petina .....	796	30	28	Yacka .....	•	19	17
Pine Forest .....	†	19	17	Yadnarie .....	797	20	18
Pinnaroo .....	•	22	20	Yallunda .....	•	—	—
Pomposia .....	•	—	—	Yaninee .....	•	—	—
Port Broughton .....	•	22	20	Yeelanna .....	795-6	16	21
Port Elliot .....	802	16	21	Yongala Vale .....	•	22	20
Port Germein .....	788	16	21	Yorketown .....	•	—	—
Port Pirie .....	•	—	—	Younghusband .....	798-800	21	19
Ramoo .....	797	18	16				
Redhill .....	788	—	—				

\* No report received during the month of March.

† Formal report only received.

‡ Held over until next month.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

#### UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

TARROWIE (Average annual rainfall, about 15½in.).

February 22nd.—Present: nine members and visitors.

PREPARING THE LAND FOR THE WHEAT CROP.—Mr. C. A. Kotz gave a short address on this subject. In the course of his remarks the speaker said early fallowing should be adopted, especially if the land was carrying very much rubbish. The early ploughing of the land ensured a better germination of weed seeds. He also thought it was best not to work the land in the spring time, but to allow the sheep to have the run of the paddocks, and work the soil with harrows after a fall of rain. If weeds made their appearance the land could be cultivated after harvest, or left until seeding time. Mr. C. Hortin tabled a sample of Sudan grass. The seed had been sown in November, and at the time of cutting the crop was 3ft. high.

WILLOWIE (Average annual rainfall, 11.90in.).

March 22nd.—Present: 11 members and visitors.

CARE OF HARVESTING MACHINERY.—Mr. A. P. McCallum, in the course of a short paper dealing with this subject, said if farmers wished their implements to have a long life they should take reasonable care of them. When the machine had finished its work for the season it should be overhauled, thoroughly cleaned out, and a note taken of new parts required; after that it should be placed under cover until required next year. When the machine was working in a moderately heavy crop it was necessary to keep the belts tight to prevent them from slipping. He had found a mixture of resin and castor oil very useful in preventing the belts from slipping. An adjustable comb attached to the harvester was a great advantage, for it enabled the farmer to alter the comb to suit the conditions of the crop.

HOOKINA, February 17th.—The meeting took the form of a question box, when several questions were asked and remedies suggested by those present.

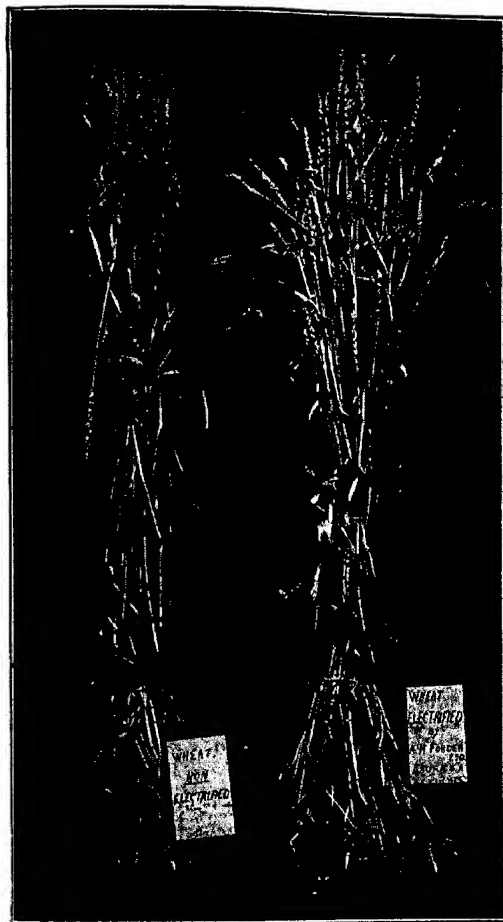
#### MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

LAURA.

Mr. A. H. Forder of the Laura Branch of the Agricultural Bureau has interested himself in the electrification of wheat. Each of the bundles depicted in the accompanying illustration was grown from eight seeds. The seeds which

were not subjected to treatment by electricity produced 55 ears, averaging 26 grains in each. Those treated produced 120 ears, averaging 30 grains.



Wheat grown from Seed Untreated and Treated with Electricity.

#### LAURA.

February 18th.—Present: 12 members.

REVIEW OF THE SEASON 1920.—Mr. E. G. Blesing read the following paper:—The year 1920 will long be remembered as one of the most remarkable as regards the rainfall, both as to quantity and how it was distributed during the year. The first months were practically rainless, but the following three months were all that the man on the land could wish for—7in. being recorded, which gave both feed and the crops a splendid start—and the succeeding three months were even better,

as 8in. of rain fell, which, with the absence of severe frosts during the spring, all vegetation grew as if it were on a hot bed, and everyone was jubilant and predicted the most bountiful harvest. During the last three months of the year, especially November, 4in. of rain fell, the effect of which was most severely felt with the hay crop, and it delayed all operations, besides damaging the whole of it, more or less, especially as most of it had to remain in the paddocks until the harvesting of the wheat was finished. The effect of the continued rain on the wheat crop has also been very considerable, not only in beating the crop down so that a good deal of it was lost, but also reducing the quality of the grain considerably by bleaching and loss of weight. The harvest right through has been a most anxious and protracted one, and no one need envy the man on the land. Apart from wheat and hay the year has been a splendid one. There has been a lot of lucerne planted during the spring all along the river flats, and never before has there been a season more suitable for germination. As to winter and spring vegetables, they have been almost a drug on the market, the supply far exceeding the demand, especially onions and potatoes, and owing to their prolific growth the keeping quality is very much reduced. The returns from the fruit crops are very satisfactory; plums have been plentiful, also apricots, but peaches were hardly up to the average, while most of all late ripening fruit has been considerably damaged by the severe heat-waves experienced since the new year. Trombones, pumpkins, cucumbers, and tomatoes in open positions have been completely burned up. Some months since we had a discussion on the relative value of green summer fodder—of course, everyone will admit that lucerne is the king of fodders—but it is very partial as to soil. Given a favorable season and irrigation, even with brackish water, amber cane will produce more in weight during five months in the summer. I have about an acre of lucerne and a quarter acre of amber cane, and have cut far more amber cane than lucerne since the middle of December. I consider the first cut of cane equal to four cuts of lucerne in weight, and you can keep on cutting until frosts come. Sudan grass, I think, will supersede most of other summer fodders, as it is more drought-resisting and will grow in almost any soil, is a quicker grower, palatable to any stock, and the more you cut it the better growth it makes. Messrs. F. T. Hughes and E. Pech reported on experiments conducted by them with oats and wheat treated with electricity by Mr. A. H. Forder. Both members stated that there was no appreciable difference between that treated with electricity and that not treated. In the discussion which followed, the opinion was expressed that the quantity (one bag) treated was too great for the voltage.

**BUNDALEER SPRINGS.**—Present: 10 members.—**ANNUAL MEETING.**—On the occasion of the annual meeting the election of officers took place, and the following programme was compiled:—April: "Improving the Bureau," Mr. A. W. Harding. May: "Tomato Culture," Mr. J. A. Gerke. June: "Improving Farm Stock," Mr. E. T. Cooper. It was decided to place on record the valuable work done by the late Secretary of the Branch (Mr. S. H. Ellis).

**PORT GERMEIN,** January 29th.—Mr. S. J. Broadbear contributed a paper entitled "Gathering in the Hay Crop," which was well discussed by those present. Members were of the opinion that hay grown in the drier areas was of the best quality for feeding purposes, especially if grown without superphosphate.

**REDHILL,** March 1st.—The subject for the evening was a discussion, "Observations on the Past Harvest." Members were of the opinion that it was best to sow late wheats, as they were not so likely to "go down" and tangle as the early varieties.

## LOWER-NORTH DISTRICT.

### (ADELAIDE TO FARRELL'S FLAT.)

#### BLACK SPRINGS.

February 24th.—Present: eight members and visitors.

**COLT BREAKING.**—The Hon. Secretary (Mr. C. M. Hudd) read the following paper:—"When the colt is first brought into the yard, start to run him around with the aid of a whip, and at various intervals try to bring him up to you. Eventually he will find that you do not intend to hurt him, and will face you."

Then try and place a rope around his neck, and if he turns away give him a sharp cut with the whip, and fetch him up to you again. After the rope has been attached, place a strong leather halter on him, and then put the bit in his mouth. Never put a pair of blinkers on the colt while handling him; rather let him see all that is taking place. Then fix a rope to the bit, and place a 4 in. surcingle and small padded saddle across the back, with a rein on each side. Buckle this tightly around the colt, and fasten the reins to the bit sufficiently tight to slightly arch the neck. Leave this on for the best part of the day, and the colt will gradually mouth himself. The second day the colt should be caught, and special care taken to keep him moving in a circle to avoid the danger of his pulling away. He should then be rubbed all over with a bran bag tied on a long bamboo stick. After proper fitting harness has been chosen he should be made to pull a log. Use long chains, so that if he kicks he will not strike the swing. After he has been working for about 20 min. take off the blinkers, and leave the halter on, so that the colt can see what is behind him. Frequently stop and start him, and after about an hour's teaching he can be taken to the stable, and tied up with a strong rope for three or four hours. The following day he should be given about an hour's work in the land roller, as that will teach him to walk straight. After this the colt should be ready for the body of the team, but care should be taken not to overwork him for a start, for if that is done he will become slow and sluggish. After working, the shoulders should be washed with cold water and a little washing soda; this will harden them, and minimise the danger of sore shoulders. Naturally, some will think this method too slow, but if we are to get the best from the colt, we must handle and treat him properly, and a little longer spent in the handling will be time well occupied.

#### MALLALA (Average annual rainfall, 16.88 in.).

February 7th.—Present: 12 members.

**MILKING MACHINES.**—Mr. F. G. Pike read a paper on this subject that had been contributed by Mr. A. P. Wilson. It was stated that on the majority of farms the dairying industry was regarded as a side line, and, more often than not, the task of looking after the cows was left to the women folk. In the Mallala district it was treated as a side line, and until quite recently very few people had realised what an asset the dairy was to the farm. The prices for milk and cream during the past months had been very good, and those farmers who had the good fortune to own animals that yielded good returns knew that the dairying business was a payable proposition. The writer of the paper did not think it could be denied that the usual method of milking the cows and separating the cream was a tie, and that during the harvesting operations a good deal of time had to be devoted to the cows. There were a number of good milking machines on the market, and he had found that, since the installation of a milking outfit on his farm he had been able to deal with larger quantities of milk, with less labor and greater profit. Certain alterations had had to be made to the milking-shed, and it was possible that some dairymen might object to the installation of the machines on that account, but after giving the machines a good trial, he was convinced that the machines made for the better handling of the produce and the more comfortable working of the dairy. At the present time he had 20 cows in milk, and the whole of the work, including the separating, was done in about an hour. The cost of the upkeep of the machine was very small, and the engine could also be used for other jobs on the farm.

**HARVEST REPORTS.**—At a further meeting held on March 17th the following reports of the past harvest were received:—Mr. H. F. Rowe—Early Gluyas, 1½ bush. seed and 1 wt. super to the acre produced 21 bush. to the acre; hay, 2 tons to the acre. Messrs. R. H. and K. Oliver—Gluyas 20 bush., Carawa 29 bush., cross-bred 24 bush.; malting barley, although shaken very badly, returned 26 bush.; hay crop, 2 tons to the acre. Mr. A. E. Temby had sown 1½ bush. seed per acre and 100 lbs. super, with following results on fallow:—Late Gluyas 18 bush., Baroota 18 bush.; King's Red, 2 tons hay per acre; stubble ground, Late Gluyas 10 bush. Mr. J. A. Arnold reported the following results on fallow:—Gluyas, partly spoilt by charlock, 17 bush. per acre; Florence, 30 bush.; Combination, 8½ bags per acre; Major, 8½ bags per acre; barley, 37 bush.; hay crop, 2 tons per acre. Wheat pickled with bluestone had a little smut; wheat pickled with formalin had smut visible.



An Exhibit staged by the Members of the Lone Pine Branch of the Agricultural Bureau at the Tannunda Show on February 15th, 1921.

LONE PINE.

February 22nd.—Present: 19 members and visitors.

SUMMER FODDERS.—In the course of a short paper under the title, "The Importance of Summer Fodders," Mr. J. A. Nelder said feeding green fodders to the milking cows during the summer months was most profitable, and to make dairying a success it was important that the animals should have green feed throughout the whole of the year. Of the many fodders that had been tried, lucerne held first place. It not only kept the cows in condition, but also maintained the milk flow to the greatest extent. It was advisable to sow maize that would be ready when the lucerne was finished. The crop should be sown to make an autumn or early winter fodder.

TWO WELLS (Average annual rainfall, 16.36in.).

March 23rd.—Present: seven members.

Mr. A. Pratt tabled an interesting display of grain of different varieties of wheats and oats. The samples had been selected from his experimental plots during the season 1920-21. Mr. Pratt explained in an instructive manner the varying results obtained from year to year, and considered that far too many varieties of wheats were being grown at the present time. In selecting wheats it was not always advisable to choose the largest heads, but rather to take those which were true to type.

LYNDONCH, February 17th.—Mr. S. G. Bishop gave an instructive address on "Fencing." The remainder of the evening was devoted to a discussion on the report of the delegates to the Lower Northern Conference.

LYNDONCH, March 24th.—The subjects, "Cool Storage" and "Star Thistle," were brought before the meeting for discussion. The Hon. Secretary (Mr. J. S. Hammat) tabled three varieties of tobacco plants, and gave a brief account of his experiences with the growing of the plants up to the stage of hanging the leaf.

ROSEDALE, February 23rd.—The annual meeting of the Branch was held, when the balance-sheet and report of work performed during the past 12 months were presented. The election of officers then followed.

SADDLEWORTH (WOMEN'S), March 8th.—Mrs. L. Baldwin contributed a paper, "Beautifying the Home," and an interesting discussion followed.

WILLIAMSTOWN (WOMEN'S), March 2nd.—Mr. J. S. Hammat (Hon. Secretary of the Lyndoch Branch) attended the meeting, and addressed the members on the general working of a Branch, after which the officers were elected for the ensuing year and a programme arranged.

WILLIAMSTOWN, March 18th.—Papers on the subject "Bee Culture" were contributed by Messrs. J. H. Mitchell and A. S. Grigg. Mr. H. N. Wicks, of Balthannah, who was present at the meeting, delivered an address, "Cool Storage." An interesting discussion followed, and the speakers replied to numerous questions.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

DOWLINGVILLE (Average annual rainfall, 13in. to 14in.).

February 25th.—Present: seven members.

FENCING.—Mr. W. J. Wheatcroft, who read a short paper dealing with this subject, said good fences were necessary on every farm. In districts where the natural timber was becoming scarce, farmers were obliged to send to other parts for posts. A very substantial fence could be erected by placing wood posts, either split gum or mallee, at about 40ft. apart, with three iron standards between. To make it sheepproof six wires should be used—four plain and two barbed on top. A stronger top barb would be better, as it would not be so easily broken by cattle feeding over the fence. That class of fence would be suitable for the boundaries.



Good strainers should be selected for the corners and ends. They should be placed about 9in. deeper in the ground than the ordinary posts, and be well strutted each way to prevent them from giving when the wires were strained. A cheaper fence for the divisions could be erected by placing the posts a little farther apart, with jarrah droppers between. Repairs were necessary to fences where wires were broken or posts destroyed by white ants. Fences that were in need of repair were a constant source of danger to livestock, not only by becoming entangled in the wires, but by getting into an adjoining crop. Gates of wood or iron should be erected where necessary, and if hung on substantial posts would last much longer than those made of wire. Good fences increased the value of the land, and added to the general appearance of the farm.

#### KILKEBRAN.

February 17th.—Present: 10 members and visitors.

**ADVANTAGES OF THE AGRICULTURAL BUREAU.**—The Hon. Secretary (Mr. J. W. Cogan), who read a paper on this subject, said the present-day farmer had many advantages over the pioneers of the State, and not least among those was the benefits that were derived from the Bureau system. There was practically no branch of rural production that did not come within the scope of the work carried on under the auspices of the Agricultural Bureau all over the State. If any member of a Branch desired information on matters dealing with wheatgrowing, horticulture, poultry raising, dairying, or stock, all that was necessary was to communicate with the expert officers of the Department of Agriculture, who were always willing to give the man on the land the benefit of their knowledge. The Agricultural Bureau was an encyclopaedia for the primary producer. The speaker considered it to be the duty of every member to endeavor to get the young men of the district interested in the work of the Bureau, for the subjects that were dealt with at the meetings were interesting as well as educational. An interesting discussion followed.

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**MAITLAND** (Average annual rainfall, 20.08in.).

March 5th.—Present: 12 members.

**HARVEST REPORTS.**—The following harvest reports from the undermentioned members were received and discussed:—Mr. Bentley reported an average of 30bush. He considered Federation the best wheat; Major dried up very badly. Mr. Brown grew Major, Federation, Red Russian, Belgian Wonder, and Late Gluyas. Major went off badly. He strongly recommended Belgian Wonder, with Federation a close second. He favored Red Russian for late sowing, and Gluyas the best variety to sow on stubble land. Mr. S. R. Smith grew Walker's Wonder, Prolite, Red Russian, Federation, Nugget, and Major; Prolite gave the heaviest return. Mr. Jones stated that Carawa was very superior to any other variety. Late Gluyas, 27bush., but affected with takeall; Nugget, 27bush., but affected with black rust. Major grew very slowly. Red Russian, 23bush.; good wheat for late sowing. Canaan, 23bush., but very liable to blight. Minister, 24bush.; very poor stubble in proportion to return of grain. Mr. Parsons reported that Federation turned out the best. Carawa was good, but badly affected with smut. Mr. F. B. Smith—Onas yielded best; Federation and Red Russian good; Walker's Wonder yielded the lightest crop. English and Cape barley both good. Mr. Pearce grew Major and Federation; both averaged 30bush. Mr. Boxall—Federation averaged 8 bags and Carawa 4 bags to the acre. Mr. Pitcher—Major, 24bush.; Belgian Wonder, 31bush.; Canaan, 18bush.; Carawa, 21bush., dried off badly; Federation, 27bush.; Red Russian, 27bush.; average for all varieties, 27½bush. per acre. Mr. Bentley pickled with bluestone; had no smut. Mr. S. R. Smith pickled with formalin; no smut. Mr. Brown favored bluestone, and considered it saved labor. Mr. Jones used formalin, because it was cheap, easy, and clean to handle. It was immaterial how long the seed was pickled before using. Mr. Parsons favored bluestone, but it required a lot of work. Mr. Pearce used formalin, and stated that care should be taken not to stack the pickled grain before it was dry.

**MOONTA** (Average annual rainfall, 15.22in.).

March 19th.

Mr. Thos. G. Cliff read the Department Bulletin, "Manures in their Relation to Present-day Farming," and an interesting discussion followed, in which Messrs. H. J. Cadd, J. Atkinson, C. Cooper, and A. B. Ferguson took part.

**PASKEVILLE**, February 21st.—Mr. J. C. Sykes contributed a paper entitled "Bookkeeping for Farmers," which proved to be of great interest to those present. Mr. Norris tabled a sample of Sudan grass 5ft. high, which was sown on November 3rd at the rate of 4lbs. to the acre with 50lbs. of super.

**WESTERN DISTRICT.**

**GREEN PATCH** (Average annual rainfall, 26.56in.).

February 21st.—Present: nine members.

A discussion took place on the best varieties of barley to grow in the district. Mr. Sage read extracts on the "Use of Ground Lime on the Land" and "The Use of Super on Sour Land," and a good discussion followed. The Secretary (Mr. R. L. C. Sinclair) tabled a sample of Elephant grass, which he had grown in the district.

**MILTALIE** (Average annual rainfall, 14.55in.).

February 21st.—Present: six members and two visitors.

**SEED WHEAT SELECTION.**—Mr. J. S. Jacobs contributed a short paper on this subject. He advised members to procure a change of seed every two or three years, but they should be careful to obtain seed that was free from impurities. Salt, he said, should be mixed in the bluestone solution, because it helped to kill the germs, but he thought it would take a long time to free wheat from smut. Members should be on the lookout for new varieties of wheat, and each variety given a trial for two or three years. He suggested sowing early wheats, because the growing season was very short, and, as a rule, only light late rains were

received. He had obtained the best returns from Golden Drop. Late Gluyas was also a good variety for that district. During the discussion which followed, the members were of the opinion that the early and midseason varieties were best suited to that district. Seed wheat should be pickled several weeks before seeding, and smutty grain should not be used for sowing. Mr. D. C. Bagnell thought the selection of seed true to type and free from smut very important; he also favored a change of seed, and thought members should club together, and import new varieties for trial. He gave an instance where two bags of Carawa yielded 85 bags. Mr. P. J. McEachen also favored early wheats.

#### ROBERTS AND VERRAN.

February 21st.—Present: six members and one visitor.

SCRUB CLEARING.—Mr. H. F. Imhoff contributed a paper on this subject. Scrub should be rolled in the winter time, he said, because it would then have time to dry thoroughly, and it was possible to grub up a number of stumps while the ground was wet. Rolling should be completed by the end of September if possible; there would then be time to cut springbacks and clear breaks before the hot weather. For low scrub he preferred using a roller, constructed from a steel boiler 3½ ft. high. The wear would be on the outside axle blocks, which could be easily renewed, and if the axle was securely fastened that would prevent it from turning in the roller. Six horses could work a 10 ft. roller comfortably. A break 22 yds. wide should be cleared around the land to be rolled. In clearing a break, a strip 6 ft. wide on either side should be cleared thoroughly, the inside strip being thrown on the rolled scrub, the centre then being burnt. A hot day, with a north wind was to be preferred when burning scrub. The fire should be commenced on the south side, and left to burn back against the wind. When the burn had been completed the roots should be trimmed, and the sticks, &c., placed in heaps and burnt. The ground was then ready for the plough. During the discussion which followed, Mr. Sharman said he favored early rolling, thus enabling the shoots to have a fair growth before burning.

#### ROBERTS AND VERRAN.

March 21st.—Present: six members and visitors.

PREPARATIONS FOR SEEDING.—Mr. E. C. Videon read a short paper on this subject. The best method of obtaining an ideal seed bed, he said, was by early fallowing. The land should be thoroughly ploughed to a depth of 4 in., and after a short interval it could be cultivated at a depth of about 2 in. until clear of weeds. The shallow cultivation would not disturb the seed bed, but would help retain the fine surface, which was so necessary for conserving moisture. Patches subject to drift should not be worked down too finely, but it was impossible to lay down hard and fast rules for such areas. Sometimes such intense working was impracticable, yet rough fallow was better than none at all, and vegetation appearing thereon should be grazed, if possible. Stubble land should be burnt or fire-raked before ploughing, for that tended to destroy any diseases or parasites which might have appeared in the previous crop. Ordinary ploughing could then be carried out, and the land cultivated immediately prior to seeding. Virgin land, i.e., scrub rolled and freshly burnt, could be worked on the same lines as stubble land with considerable advantage. He advocated a careful selection of seed and the overhauling of all machines prior to seeding operations. Mr. F. Masters, in discussing the paper, thought that fallow at 4 in. was a little too deep for that country, as deep ploughing slightly encouraged take-all. If the subsequent workings were carried out correctly, no doubt that would tend to remedy the matter. The speaker also found favor with the fallowing of virgin land. He cited an instance of his own experience with land treated in such a manner, and remarked on the general improvement of the condition of the soil. Mr. E. C. Videon, in reply, stated that 4 in. was not too deep for fallow, for if the land was ploughed at a less depth, the subsequent workings and the original fallow would be of the same depth, and being so, would not permit the forming of a seed bed. He did not consider it necessary to fallow virgin land, but would take advantage of the land immediately for cropping.

TALIA.

March 5th.—Present: seven members and five visitors.

The Hon. Secretary (Mr. W. J. McBeath) read a paper, "Reaper-Thresher and Harvester *versus* Stripper and Motor Winnower," which resulted in a long and interesting discussion. As there was a considerable diversity of opinion, a vote was taken, which resulted in a majority in favor of the reaper-thresher and harvester. Relative values of fodder and remedies for stock affected through eating wheat formed subjects for discussion, and the meeting terminated as one of the most successful that the Branch had held.

YEELANNA.

February 19th.—Present: 14 members.

"SUITABLE WHEATS FOR THE DISTRICT."—The Chairman (Mr. G. W. Proctor), in the course of a short paper on this subject, said certain varieties of wheat grew better in some seasons than other varieties. He was of the opinion that the Late Gluyas variety was best suited to their district. It stood up fairly well, did not shake out, and gave a good straw for burning shoots. The next best wheat, he thought, was Federation, but it should be sown on land that was free from shoots, because it did not contain body enough to burn readily. It was a good wheat to yield, and could be reaped late in the season, because it was not affected by storms to the same extent as other wheats. Canaan was also a good wheat for the average season in that district. He would sow those varieties at the rate of 50lbs. of wheat to the acre on light, sandy soils, and 55lbs. to 60lbs. of wheat on heavier soils. The wheat should be pickled before sowing, the solution being prepared by dissolving 1lb. bluestone in 10galls. of water. A good discussion followed, the majority of the members favoring the views of the writer.

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## YEELANNA.

March 18th.

**CARE AND MANAGEMENT OF FARM HORSES.**—With the approach of seeding time every farmer should see that his horses were in a condition to undertake hard work, said Mr. K. Dunn in a paper on this subject. Horses that were in low condition were more likely to contract a disease, and more deaths would occur. They should be fed four times a day, and supplied with water at least three times a day. He would not place the water trough in the stable yard; the animals would receive more benefit if they were regularly turned out to water. They required a water-proof stable that was cool in summer and warm in winter. It should be built on sloping ground, facing either the north or the east in order to provide as much shelter as possible. He favored a stable that was constructed in the form of a letter L, it would then provide shelter on two sides. The horses should be allowed to run free in the stables. For the mid-day feed he mixed a few handfuls of crushed oats with the chaff. If the horse had to eat his dinner without a drink he would damp the feed, and add a few handfuls of bran in addition to the oats, so that they would eat it more readily. In the summer months, when there was no green feed, the horses should be given bran in their feed at last once a week. A good discussion followed the reading of the paper.

**BIG SWAMP, February 24th.**—The question of "Sheep Dipping" was brought before the meeting, and discussed. It was decided to hold a social evening during the month of April.

**EDILLILIE, February 25th.**—**FODDER CROPS.**—The report of members who had conducted experiments with varieties of fodder crops was received. The crops grown were maize, sorghum, and Sudan grass. The plants most favored were those that provided the greatest amount of bulk food with the maximum of grazing. The majority of members contended that sorghum was the best fodder plant to grow for that district, with Sudan grass the next best.

**ELBOW HILL, February 19th.**—**HARVEST REPORTS.**—Mr. P. W. Wheeler reported increased grain yields, which he believed was due to heavier dressings of superphosphate. Mr. Cowley also advocated heavier dressings of superphosphate. He advised using from 70lbs. to 1 cwt., according to the strength of the soil. Mr. Cooper advised waiting until after the first rains before sowing. He thought that dry working caused takeall. Mr. Story sowed 60lbs. super, and, in places, 90lbs., but he could not see any improvement. His crop was also badly affected with takeall. Mr. H. J. Wheeler thought that the disease was in the ground, and, if so, it would appear in the crop. As a remedy he advised alternate cropping, and sowing oats.

**GREEN PATCH, March 21st.**—A good discussion took place on "Poultry." Mr. Page advised members when purchasing high-priced breeding birds not to select roosters without combs. The combs were frequently cut off, he said, to obliterate a fault. The question of the erection of further shipping accommodation at Port Lincoln was also brought before the meeting.

**MILTALIE, January 22nd.**—The arrangements for the forthcoming Conference, to be held at Cowell on March 17th, were discussed. At a further meeting on February 21st, subjects were sent in for discussion at the Conference.

**PETINA, February 26th.**—A good discussion took place on the best method of cleaning wheat, the majority of members being of the opinion that the motor power winnower was the most up-to-date machine at present. Mr. G. P. Roberts tabled samples of Federation and Early Gluyas wheats.

**SMOKY BAY, February 19th.**—Mr. G. Lovelock gave an interesting account of harvest results. Late Gluyas wheat sown in May without manure yielded 21.12bush. The same variety sown on June 14th-16th, with 47lbs. of manure, yielded 19.5 bush. Federation sown in May without manure yielded 18.12bush. The crops sown in May were on stubble ground, which had been drilled and har-

rowed; those sown in June on ground that had been ploughed, rolled, drilled, and harrowed. Mr. Caddy thought Queen Fan would become a popular wheat in that district. Caliph had yielded payable returns.

YADNARIE, February 22nd.—After being in recess for harvesting operations, the reopening meeting of the Branch took the form of a social gathering.

## EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES).

### GLOSSOP.

March 16th.—Present: 13 members.

LAYING OUT A BLOCK.—Mr. W. N. Ellis, who read a paper on this subject, said the ground should first be most carefully graded in order to allow for an even distribution of water. After ploughing, consideration should be given to the depth and drainage of the soil. Deep, well-drained land might be successfully planted with almost any variety of fruit tree or vine, but care should be taken that only the hardiest varieties were planted on the poorer classes of soils. Twenty-foot headlands would prove to be of a convenient width for working operations. Tanks should be handy to the house and stable. Drying racks were best situated near the house and away from roads, so that dust would not come into contact with the fruit. A quarter of an acre should be set aside for a house garden, and a small area near the tank used for growing vegetables.

SELECTION AND MAINTENANCE OF IMPLEMENTS.—Mr. L. C. Tucker read a short paper on this subject. He said when an implement was put away it should be overhauled, so that when needed again it would be ready without delay. The best implements on the market should be secured, all machines given a coat of paint or red lead in the autumn, and kept under cover when not working. He considered it advisable to use liberal quantities of heavy oils or axle grease for lubricating. Both papers proved most interesting to members, and caused a lively discussion.

### MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

February 18th.—Present: 16 members and six visitors.

HOW TO MAKE FARMING PAY.—Mr. A. P. Braendler, in a short paper on this subject, expressed the opinion that unless the area of the farm was sufficiently large to grow a thousand bags of wheat a year, the farmer would not be able to make very much profit unless he adopted a system of mixed farming, and had a family to help with the work. Provided the farm was not too small he could keep a few working horses and a flock of sheep to clean up the land. The flock should consist of ration sheep, wool producers, and also few fat stock or lambs for market. Milking cows were profitable, but they should always be well fed, unless paddock feed was very plentiful. Pigs were also a good source of income, and the numbers kept could be regulated by the milk received from the cows. Poultry, if properly cared for, would enable the farmer to sell a few dozen eggs every week. Plenty of water should be provided for the stock, especially in the summer time. A sufficiency of hay and clean straw should be kept in stacks in order that the stock could be fed during the winter or in a dry season. That would obviate the necessity for buying feed when the prices were high, and the farmer would then be able to keep his stock over the dry period, and sell them when prices were high. During the discussion which followed, the majority of the members agreed with the views of the writer.

### RAMCO.

January 24th.—Present: 12 members and one visitor.

PREPARING FOR HOUSE BUILDING.—Mr. J. Boehm contributed a paper on this subject. A suitable position, he said, should first be selected, and the foundation excavated to a depth of about 9in. or 12in., and then filled with concrete. He advised using cement concrete, with three or four  $\frac{1}{2}$ in. steel rods in each wall. About

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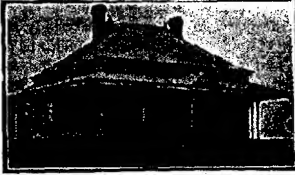
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seven barrow loads of clean sand should be used to each bag of lime. If sharp sand was available he would use about half of each. If the foundation had much "fall" the concrete should not be put in on the same level, but have a "set-off" about every 6ft. to prevent the wall from slipping. If the corners and doors of the house were to be built with bricks, and not cemented, the brick mortar should consist of three barrow loads of white sand to one bag of lime. The outside walls of the house should be not less than 14in. wide, and the inside walls from 9in. to 1ft., excepting brick partitions, which need only be 4in. through. The usual height of the walls was 10ft. 6in. from the floor, but to have the home cool it was better to have the walls high, and have lath and plaster ceilings. For pointing the outside walls, he suggested a five-to-one mixture, prepared about three days before using. For floating, the mortar could be mixed in the proportion of eight to one if the setting coat was put on with plaster of Paris, but, if only floated, it could be mixed to a suitable color. During the discussion which followed, Mr. Robertson said fibrous plaster was superior to lath and plaster for ceilings, because they were better suited to South Australian conditions. If lath and plaster ceilings were erected, the timber was liable to expand and contract with the weather.

#### YOUNGHUSBAND.

February 24th.—Present: 10 members.

**VERMIN DESTRUCTION.**—In the course of a paper dealing with this subject Mr. G. Mann said the rabbit was the greatest pest that the farmer had to contend against, but it was possible to keep the rodents under reasonable control if proper methods were adopted. He was of the opinion that the best thing to do was to systematically work over the whole of the holding with traps, blocking up the holes as the rabbits were destroyed. In the summer months, when the grass was scarce, the poison cart would prove very useful. If the destruction was to prove entirely successful it was necessary that adjoining farmers should destroy the rabbits on their property. Although the fox helped in keeping the numbers of rabbits down, there was no doubt that he was a menace to the man on the land. The one consoling fact was that one was able to secure good prices for the skins during the winter months. At certain times of the year, and particularly when there was a large number of young rabbits about, it was possible to destroy the foxes. Pieces of the liver of a rabbit and birds, such as starlings and sparrows, made very tempting baits for the fox, and if a little strychnine was added the animals would be killed. It was important not to handle the baits more than was absolutely necessary. One was able at times to snare the foxes by placing traps about 5ft. or 6ft. from a piece of meat or offal where they had previously been noticed. With the exception of the sparrow he did not think there were very many birds that worried the farmer. At one time he had thought that starlings, especially when one saw such large numbers of them in the fields, must do a great amount of damage; but on watching them more closely he had come to the conclusion that they were more of a friend than an enemy to the farmer, as they destroyed very large quantities of grubs and caterpillars. From the point of view of the fruit-grower there was no doubt that the starling did a good deal of damage, but by taking notice of their roosting places it was not a very difficult matter to destroy them. The speaker voiced a plea for the preservation of some of the native fauna. Referring to the kangaroo, he said there were only a few of those animals left in their district, and they could not possibly be called a menace to the farmer. Any person who begrudged the little that one or two kangaroos might eat would be very narrow minded. The mallee hen was also another very interesting bird, and he deprecated the practice of some people who collected the eggs. An interesting discussion followed.

**BARMERA, March 21st.**—Mr. W. Muspratt (Irrigation Instructor) delivered the fourth of his series of lectures. The speaker dealt with the processes adopted for the drying of various types of grapes and currants. Hints regarding the erection of the racks and trays were also given, and the speaker answered a number of questions.



**BEBRI**, March 21st.—Mr. C. G. Savage gave an account of his recent trip to Tasmania, and matters relating to the proposed pruning competitions were brought forward for discussion.

**LONE GUM**, February 17th.—Mr. R. A. O'Connor, M.P., gave an interesting address, "Co-operation and Its Aims." The speaker dealt with the different methods adopted and the good results obtained by co-operation.

**LONE GUM**, March 25th.—An interesting and instructive paper, dealing with the subject "Bookkeeping," was contributed by Mr. L. Peacock. A keen discussion followed.

**WILKAWATT**, March 19th.—Mr. D. F. Bowman read an extract from the *Journal of Agriculture*, "Benefits to be Derived from the Agricultural Bureau." Mr. C. R. Preiss also read a paper, "Dairying on a 700-acre Farm." An interesting discussion followed the reading of the papers. It was decided to convene a special meeting, to give consideration to the selection of the members who proposed attending the "Short Course for Farmers" at the Roseworthy Agricultural College.

**YOUNGHUSBAND**, March 24th.—The Hon. Secretary (Mr. W. G. McNeil) gave an address, "The Treatment of Swamp Lands in the District," to a good attendance of members and visitors. An interesting discussion followed.

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## SOUTH AND HILLS DISTRICT.

### ASHBOURNE.

February 21st.—Present: 15 members.

The meeting took the form of a debate, "Summer Growing *versus* Spring Growing of Potatoes." Messrs. K. Kirkham and V. H. Payne spoke for summer growing, and Messrs. Geo. Sissons and M. South for spring growing. A good discussion followed. Mr. K. B. Kirkham tabled some very fine samples of Pink-eye potatoes. Members were unanimously of the opinion that they were some of the largest potatoes they had seen grown in the district.

### BLACKHEATH.

March 19th.—Present: nine members.

**FARM PESTS.**—In the course of a paper dealing with this subject, Mr. H. Paech said the rabbit was one of the worst pests that the farmer had to deal with. He believed that the damage caused by the rodents could be considerably reduced if the farmers were to wage war against them on systematic lines. All harboring places, such as bush growth, fallen timber, and warrens should be destroyed, and the landholders asked to set aside a certain time of the year when a united destruction campaign could be undertaken. Weevil and mice were also responsible for a fair amount of damage, but he did not think they could be regarded as a serious menace, excepting when a plague of the pests prevailed, and at those times one was practically powerless to cope with them. Smut, bunt, take-all, and rust caused the wheat farmer very heavy losses in some seasons, but by exercising proper methods of tillage, and using clean and treated seed, a good deal of the losses could be prevented. They were fortunate in that district in that they were not troubled to any great extent with noxious weeds. The plant known as "paddy melon" had recently made its appearance, and was causing trouble on the agricultural land. He had the reputation of having shot, 20 years ago, the first fox that was killed in that district, and it was never once thought at that time that the fox would become such a great pest to the landholders as it was to-day, and although large numbers of them were destroyed every year, yet they still seemed to be increasing. He believed it would be a good plan for all the farmers to co-operate and lay poison baits during March and April. If a little strychnine was inserted in the dead body of a parrot, there would not be very much danger of valuable domestic dogs picking up the baits. In districts where the sheep tick was prevalent flockmasters should strictly follow the practice of dipping the sheep every year. To the sheep owner he considered the blow fly to be one of the most serious pests. They attacked the sheep in a most cruel manner, and up to the present time no reliable remedy had been discovered. Of the bird pests, he considered the parrot and the starling the two worst that the orchardist had to fight against. The codlin moth was also a bad pest in the garden unless the trees were thoroughly sprayed.

### HARTLEY (Average annual rainfall, 15in. to 16in.).

February 16th.—Present: 12 members and one visitor.

**WOMEN'S LIFE ON THE FARM.**—Mr. H. S. Stanton contributed a short paper on this subject. All farmers, he said, were keen in securing labor-saving appliances to enable them to produce more from the land, and they should be equally keen in endeavoring to lighten the labors of their wives and daughters. A good discussion followed the reading of the paper.

**HARVEST RESULTS.**—A discussion took place on the results of the harvest. Smut-proof wheat did best, 12bush. to 24bush. being produced. Other varieties averaged about 18bush.; oats, 15bush. to 40bush.; barley, 18bush.; and hay from 1 ton to 2 tons.

### MILANG.

November 13th.—Present: 27 members.

Mr. W. J. Follett contributed a paper, "Heredity and Breeding." The speaker traced the domestication of the animals most useful to man from the earlier days down to the present time, and showed that it was only by careful breeding and

selection that they had reached their present standard. He quoted numerous authorities, who had given the matter their consideration, and his own impressions, that were gained while a member of the A.I.F. in the Old Country.—At a further meeting, held on December 11th, Mr. W. F. Nadebaum read a paper, "Educating the Farmer."

**PORT ELLIOT (Average annual rainfall, 20.33in.).**

February 19th.—Present: seven members.

Mr. W. E. Hargreaves contributed a paper entitled "Progress of Cultivation of the Land." During the discussion which followed, Mr. Smith said he had found lime very beneficial on light soil, and Mr. Taylor said it was also good on swamp land. The Chairman (Mr. H. Welch) said he thought lime would encourage the growth of sorrel instead of killing it. Mr. Brown stated that in Scotland lime was freely used, sometimes as much as 2 tons to the acre being applied. A good discussion also took place on testing cream at factories.

**STRATHALBYN (Average annual rainfall, 19.28in.).**

January 25th.—Present: 17 members.

**FRUIT AND TIMBER GROWING.**—In a paper entitled "Our Neglected Hills," Mr. W. H. Cuming enumerated many of the crops that could be grown on a farm in the hills without irrigation. Some of the districts contained splendid dairying country, and the cattle did exceptionally well. The same also applied to horses and sheep. Wheat could be grown in their district without fallowing, and yielded up to 40bush. to the acre. Practically all the varieties of fruit and vegetables could be grown. The country was heavily timbered with saleable timber for posts or firewood, the chief kinds being red, white, blue, and pink gums, shea oak, blackwood, and wattle. Mr. Cuming also exhibited a collection of fodders and fruit, the maize showing a height of over 7ft. in eight weeks' growth, and Sudan grass between 4ft. and 5ft. in the same time.

**CONSTRUCTION AND MAINTENANCE OF ROADS.**—Mr. S. Bottrill contributed a paper on this subject. "Much money," he said, "is wasted annually through faulty construction and neglect in the upkeep of roads. Many have been laid down so low that they soon become a watercourse. A new road should be built high and dry. If on flat country the formation should be 20ft. wide, with the crown, when the metal has been put on, from 18in. to 2ft. higher than the natural surface of the ground, the material for the formation to be taken from outside the 20ft. One of the most important things in making a new road is in breaking the bottom metal. The usual plan is to dump the stones down and spread them out, and then put 2in. or 3in. on the top. That process made us a road that will not bind or wear, because when heavy traffic comes on it, the few cracked stones on the big ones are ground up like grains of wheat between two millstones, and in a very short time we have big stones showing above the surface. Bottom metals should be broken to 4in; if limestone is used top and bottom it could be broken to 3in., and put on as one coat. Hard stone should be broken smaller. When blinding a new road, the usual plan is to roll the metal down to a smooth surface, then put the blinding on, and as it cannot work into the stones it is soon ground into dust, and blows away or is worked into pug, and is carried away on wheels. It is far better to put the blinding (or, as it should be called, binding) on before rolling, so that it can work in to bind the stones, and so make a sound road. Red soil should be used for shouldering and blinding, but on no account should clay or sand be used. A first-class blinding can often be obtained from the side of metal roads where it has silted up. The life of a road depends very much on the people who use it. If the travelling public would make a practice of driving on the near side, the roads would wear more evenly and last much longer. A side track for motor cars should be provided where possible, as it would save much wear on the metal. The sand and dirt that accumulate on the sides of the metal should be scraped off. This could be done with a plough and scoop at a low cost. The water would then drain off, and it would be a great convenience to travellers. Instead of remaining as a bank with trenches cut through it, making it positively dangerous, the material could be used for making a motor track. When metal is broken and stacked it should not be removed with forks, as is often done. Shovels should be used. It is better to include a little dirt than lose

the best part—the fine stones. Flood waters should be kept off the roads. Spoon drains or bars should be constructed where required, but the spoon drain should be from 10ft. to 30ft. wide. The best one that I have constructed was one chain in width. Roads should not be allowed to get into a bad state, but should be repaired as soon as possible."

ASHBOURNE, March 14th.—Captain S. A. White, C.M.B.O.U. (Member of the Advisory Board of Agriculture) visited the Branch, and delivered a lecture, illustrated with lantern slides, on the subject, "The Economic Value of Our Native Birds."

BLACKHEATH, February 19th.—Mr. S. Pym read an extract entitled "Road-side Trees," which was followed by a good discussion. A programme of meetings for the next six months was also compiled.

BLACKWOOD, January 17th.—Mr. T. C. Magarey contributed an interesting paper entitled "Fifty Years' Personal Experience of Agricultural Affairs." Mr. R. Fowler exhibited specimens of 36 varieties of plums.

At a subsequent meeting, held on February 21st, Mr. Geo. Quinn (Horticultural Instructor) gave an address on "Fruit Packing for Export," with special reference to the proposed new Federal regulations.

CHERRY GARDENS February 23rd.—The Wool Instructor to the School of Mines (Mr. L. Codrington) visited the Branch and delivered a lecture on "Sheep and Wool."

CYGNET RIVER, February 22nd.—Mr. J. N. Hardwick initiated a discussion on the question, "Silos and Ensilage," and a very profitable discussion ensued.

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CYGNET RIVER, March 24th.—A very interesting evening was spent discussing "The Ailments of the Horse." Mr. J. N. Hardwick gave several useful hints on the care of horses.

LONGWOOD, March 19th.—HOMESTEAD MEETING.—The monthly meeting of the Branch was held at the homestead of Mr. R. H. A. Lewis, and an inspection was made of the orchard and garden. After tea had been provided by Mrs. Lewis, the arrangements for the forthcoming Conference were discussed.

MACGILLIVEAY, February 22nd.—The monthly meeting of the Branch was at Mr. Nicholl's residence. Samples of diseased potatoes were tabled by Mr. Wheaton, and an interesting discussion followed.

MORPHETT VALE, February 24th.—The Hon. Secretary (Mr. A. J. Furniss) tabled a sample of Sudan grass nearly 7ft. high, being the second cut of that height for the season, the first being made on December 31st. The seed was sown on October 7th. This good growth was the result of irrigation. A sample of non-irrigated grass cut at the same time was about 2ft. shorter. There was a long discussion on the hand-feeding of sheep as practised in America, and it was thought that the practice could well be extended in Australia.

### SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.).

January 20th.—Present: 15 members.

BREEDING AND MANAGEMENT OF SHEEP.—Mr. W. Holloway contributed a paper on this subject. The class of country should receive the first consideration, he said, because different types and breeds of sheep were adapted to different grazing conditions. The Merino was the most suitable breed for the drier districts, while on the rich volcanic lands the British breeds, or one of the various crosses, did well. In that district the first cross Lincoln-Merino was about the best all-round sheep; it possessed a good carcass and a hardy constitution; they made good mothers, and cut a bulky fleece that usually realised a good price. If a person possessed land in the rich agricultural areas he should raise fat lambs. The first cross ewe made a suitable mother, while Shropshire, Southdown, Lincoln, Leicester, and Dorset Horn rams would all beget suitable lambs for freezing, provided the lambs were well fed and did not receive a check. The man who was confined to poor or second-class country should give more attention to the production of wool. He regarded the first cross, or comeback, as the most suitable breed, but there was a difficulty in maintaining that type. The Corriedale and Ideal breeds had been introduced with the object of overcoming that difficulty, and if sound judgment was exercised in the selection of rams, satisfactory results should follow. All rams should possess a robust constitution, be of good shape, true to type, and be well covered with the class of wool characteristic of the breed which it represented. All operations connected with sheep breeding should be carried out thoroughly at the proper time. Merinos should be dipped about one month after shearing, and crossbreds about six to eight weeks. All the coarser sheep should be dipped about eight weeks after shearing. Crutching should be done about April, but that depended to some extent on the season, and whether the ewes were in lamb. The wool should be trimmed away from the eyes, and if any animals showed signs of lameness they should be caught and the feet examined, and treated if necessary. The rams should also be inspected before being mated with the ewes. Sheep could be caught by the hind leg, with the hand close to the hock, and held low, the left hand grasping the animal about the throat or lower jaw. All surplus sheep should be disposed of before May, unless they could be fattened during the winter, because it was unwise to run the risk of a shortage of feed for the ewes and lambs. When working rich country, and especially if catering for the fat lamb trade, it was advisable to lamb as early as possible, but in the poor country he thought the beginning of August would be early enough, because the grass began to grow during lambing, and with warm spring days they would not suffer a check. An attempt should be made to have

good stubble paddocks or some variety of fodder crop on which to pasture the lambs during January. Lambs should be marked at about six weeks of age; favorable weather should be chosen, and cleanliness observed during the operation, the instruments being dipped in some disinfectant. Frequent changes from one paddock to another were beneficial, and should be carried out as often as possible. Suitable licks should be placed in the paddocks at camping or watering places. If the last two suggestions were systematically carried out they would do much toward preventing blindness in flocks. The fences and windmills should also be kept in good repair and a strenuous war waged against rabbits. During the discussion which followed, Mr. F. A. Telfer said that he considered August was the best month for lambing, because at that time there was plenty of feed available. Paddocks should be reserved in the autumn if it was intended to have early lambs. Plenty of feed was the best preventive for worms in sheep. Mr. John Riddoch thought that early lambs were the best for freezers. If Shropshire rains were used the ewes would need attention at lambing time because of the large heads of the lambs. He did not favor Southdown rains, but thought the Dorset Horn would prove valuable because their progeny matured very quickly, and that was a great advantage in the fat lamb trade. Mr. J. Dow favored the Romney Marsh, because the wool was excellent and they were suitable for lamb raising. Mr. W. Holloway said the stud from which his Corriedale rams had been obtained had been established for 40 years, and he was well satisfied with the progeny of the rams, and they also cut a good fleece.



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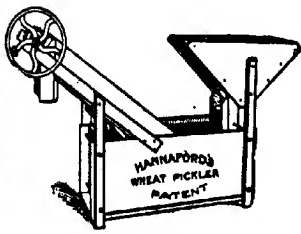
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## LUCINDALE.

March 6th.—Present: eight members.

THE CLYDESDALE.—Mr. Cottrell contributed a paper on this subject, which was read by Mr. Secker. He said:—"The Clydesdale horse came originally from a cross between some Flemish stallions that were imported into Scotland over 200 years ago by an ancestor of the Duke of Hamilton, and Scottish mares that were in the country at that period of its history. The Clydesdale horses were recognised as a distinct variety in 1782. In the year 1715 it is stated in the stud-books of the Clydesdale Society, John Patterson, of Lochlyoch, in the parish of Carmichael, went to England, and purchased a Flemish stallion, which he brought home, and crossed with the North Ward mares, the result being that the progeny became known for their excellence all over Scotland. The Lochlyoch mares, it is added, were generally browns and blacks, with white faces, and a little white on their legs. They had grey hairs in their tails, occasional grey hairs over their bodies, and invariably a white spot on their belly, this latter being recognised as a mark of distinct purity of blood. A bay Clydesdale stallion won the first prize at Edinburgh in 1759. A bay color, therefore, must have been accepted as a correct color of the breed upwards of a century ago. The middle of the nineteenth century saw the Clydesdale being bred in other parts of Scotland, so that in course of time the Galloway Clydesdales became recognised as a leading branch of the old tree. The leading characters of the Clydesdale breed are as follows:—The head is broad across the forehead, gradually tapering towards the ears, which are rather inclined to be long and large; the forehead is wide between the eyes, which should be full and lively, though free from that hard, harsh look which disfigures the expressions of many horses. The jaws are broad, and sometimes rather coarse about the muzzle, whilst the nostrils are large and open. A narrow head is not to be encouraged, as this is usually associated with an absence of intelligence, whilst small sunken eyes are generally accompanied by a bad temper. The head should be correctly set on the neck, which it should not meet at too acute an angle. The neck itself should be lengthy and deep and nicely arched, massive and powerfully placed at the shoulders. The shoulders should be sloping, while the chest should be broad and deep, and the forelegs—a most important point of the breed—should be short to the ground from the shoulder. They should be very powerful about the arms, and should show great muscles, with flat, broad knees near to the ground, and with as much bone as possible below them. Below the knee the bone should be flat and of a good hard quality, whilst the back of the legs from the knees downwards should be well feathered with soft silky hair, coarse or curly feather being objected to by authorities on the breed. The pasterns should be long and sloping in order to give springiness to the action which is so much desired. The feet should be round, wide at the corners, the crust thick, and the heels well developed. The middle piece of a Clydesdale should be big and well sprung at the ribs. A slight drop in the back is perceptible in some of the very best horses of the breed, but should not disqualify them, although it is unsightly. The quarters are wide, lengthy, powerful, and well let down. The hocks should be well developed, broad and clean. Below the hocks the bone should be of good size and flat, the hocks being near the ground and the legs carried a little forward. The feather is plentiful, and extends upwards to the hock. The most preferable height for a Clydesdale stallion is about 16.3 hands; mares should stand lower at the shoulder. The Clydesdale is very robust generally, and can usually be relied on to withstand the effects of cold, wet, and hard work better than any of the heavy breeds in existence. He is the pony of the heavy horse; he moves freely. It is, in fact, impossible to conceive that a more active horse of his weight and height could be produced. In Glasgow he is perfectly adapted for dray and lorry work upon the granite streets of that city. He is of immense value for heavy draught work, and for general utility is commendable above any other breed of draught horse. During the discussion which followed, the Secretary (Mr. P. W. Dow) said he did not favor a heavily-feathered horse. He understood that the Clydesdale breeders had sacrificed a certain amount of body weight so as to lose some of the heavy feather of the Shire.

At a previous meeting the Hon. Secretary (Mr. P. Dow) contributed a paper entitled "Can we Prevent the Rural Exodus." On December 31st, 1918, he said 52.89 per cent. of the population of the State were residing in the metropolitan

area, and to-day that figure had risen to nearly 55 per cent. It was alarming that a state which was dependent on its primary products should have more than half of the population residing within 10 miles of the G.P.O., and some method should be found to stop the drift. It would take years, he said, to effect a cure, but a start should be made now, by making the boy on the farm interested in primary pursuits. The boy on the land would become a better farmer than one who had received a city education, because he had always lived in the district, and had been trained in farm pursuits from childhood. The farmer should encourage him to take an interest in the stock, and on no account should he be ridiculed. He should also be made responsible for some of the work on the farm that would produce income, or some of the stock could be handed over to him, and if he was given a share in the profits it would be a much greater inducement to him than a weekly or monthly wage. Competition would also encourage him, and if he could exhibit his stock at a show, and sometimes secure a prize, it would be a great inducement, but if he found that his sheep or horses were inferior to those belonging to neighbors, it would tend to dishearten him.

#### MOORAK.

March 24th.

Mr. J. F. Nicholls read a paper, "Poultry Breeding on the Farm." A long discussion ensued, in which Messrs. Palamountain, Tarrant, Boardman, and Harry took part.

APPRECIATION OF SERVICES RENDERED.—The Hon. Secretary (Mr. M. P. Fahy) tendered his resignation on account of having to leave the district. The President, in accepting the resignation, said the Branch did so with keen regret. Mr. Fahy had been a tower of strength to the Bureau and the district. Mr. Palamountain, in supporting the President, said the district and the Branch could ill afford to lose a man with Mr. Fahy's capabilities. Several successful ventures had been carried out under the auspices of the Bureau, and in no small way was their achievement due to Mr. Fahy's enthusiasm and energy. Messrs. Nicholls, Tarrant, Movey, Dixon, and Mahoney supported the previous speakers' remarks. On behalf of the Branch, the President asked Mr. Fahy to accept a case of pipes as a small token of the high esteem in which he was held by the members of the Moorak Branch of the Bureau. It was also decided to place on record the valuable work performed by Mr. Fahy. Mr. Fahy then replied.

KONGORONG, February 17th.—The arrangements for the forthcoming Conference of South-Eastern Branches were discussed, and several questions submitted for inclusion on the agenda.

MOORAK, February 17th.—Mr. I. L. Heaver read an interesting paper, entitled "Onion Growing," which was followed by a long discussion. Mr. T. H. Stafford also contributed a paper on "Maize Growing," which fodder was extensively grown in that district. A good discussion followed the reading of the paper.

MOUNT GAMBIER, March 12th.—Several matters, including the forthcoming Conference of South-Eastern Branches of the Agricultural Bureau and the visit of Mr. W. S. Kelly (Vice-Chairman of the Advisory Board) to the South-East, were brought before the Branch for discussion. The report of Mr. E. S. Alcock (Secretary and Director of the South-Eastern exhibit at the Adelaide Autumn Show) was also received and discussed.

PENOLA, March 5th.—The Hon. Secretary (Mr. A. Tresize) contributed a paper, entitled "Subterranean Clover." The speaker dealt with the soil requirements, sowing, and general treatment of the crop. During the discussion which followed, Mr. Ockley said it was a splendid fodder, but was not suitable for hard soils. He advised drilling the seed in, because if it was only harrowed the seeds would be eaten by birds.



### PASSION FRUIT.

Passion fruit plants are readily raised from seeds taken from good quality fruits, or they may be purchased from most nurserymen, says the Horticultural Instructor (Mr. Geo. Quinn).

They are warmth-loving plants, therefore the seeds should be cleaned of pulp and sown in early autumn or spring whilst the ground and atmosphere are warm.

They are sown in boxes or in a prepared seed-bed, made of about one part well-decayed organic manure or leafmould, one part sand, and one part garden loam, well pulverised and mixed. The surface of the bed or box should be levelled and flattened fairly firmly on the surface before the seeds are sown. When sown about 1in. or more apart, press them into the soil; then cover them half an inch deep with a sprinkling of sifted rotted manure and sand mixture. Water them with a finely-rosed watercan and stand in a warm but sunny spot. Keep the soil moist, but not at all sodden. The seed-bed or box may be covered over and kept dark until the seeds peep through. When the plants are 2in. or 3in. high, pot them off into small pots or tins, using good rich soil of a similar character to that in the seed-bed. After being grown a few inches higher, and hardened off by exposure to light, the plants may be set out in the garden.

The position for these plants should be one where severe frosts are not experienced, and the soil should be loose and deep, rich in organic matter, and capable of retaining moisture during the hot weather.

The plants may be trained on wire fences, but if only a few are grown, they do well against wooden or stone walls, but wires or wire-netting is essential to support them against such upright surfaces.

The soil must be well drained and stirred frequently on the surface with a hoe or fork, but not deep enough to damage the roots. If planted in a locality wherein the hot season is also a dry season, the passion vines must be irrigated. They thrive best in climates wherein the rain falls during the summer season, but also do well under irrigation.

If the plants are thriving, a few fruits are usually borne after one year's growth has taken place, and the crop increases from then on.

When grown in the open on fences, the plants reach their maximum in about three seasons, and usually begin to decline after about five years; but when set against protected walls, they often last many years longer. The pruning usually applied consists of cutting out the exhausted shoots only, but attention to tying up new shoots is desirable at most times.

# CROWN LANDS.

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## LANDS TO BE OFFERED SHORTLY.

Additional allotments in the town of Whyalla (Hummock Hill) will be offered at auction at Whyalla on May 10th, 1921.

Lands in the hundreds of Allen, Bews, Billiatt, Boolcunda, Cadell, Cassini, Chesson, Coolinong, Cotton, Dudley, Dutton, Ettrick, Haines, Hall, Holder, Hooper, Jellicoe, Kadina, Kekwick, Livingston, Macclesfield, MacGillivray, Menzies, McPherson, Marmon, Jabuk, Mantung, Mobilong, Molineux, Mongolata, Nangkita, Noarlunga, Parilla, Peake, Peebinga, Port Gawler, Price, Roby, Strawbridge, Tiparra, Waikerie, and Wilson, are gazetted open to application.

Full particulars are published in the *Government Gazette*, and plans are available on application to the Secretary for Lands, Adelaide.

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## APPLICATIONS FOR LAND.

Intending applicants for any lands which are open are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portion of a block, if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey.

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## ALLOTMENTS, SALES, TRANSFERS, SUBLEASES, AND MORTGAGES.

Notice is hereby given that in future no applications for land, or for transfer, sublease, of mortgage of Crown leases or agreements will be approved to unnaturalised persons of any nationality, or to naturalised persons of enemy origin unless the consent of the Honorable the Attorney-General of the Commonwealth be first obtained by the parties making the application.

Where any doubt as to nationality exists, it will be necessary for certificate of birth or naturalisation papers to be exhibited.

The same principle will apply to land sold by auction.

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## OFFICIAL LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which may be seen at the principal Post Offices, and copies obtained at the Office of the Secretary for Lands. The List shows the Areas, Localities, Prices, &c., of the Sections available and the conditions under which they may be applied for.

G. R. LAFFER,

*Commissioner of Crown Lands and Immigration.*



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